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LIETZ

COMPANY

SURVEYING & DRAFTING SUPPLIES



FOUNDED • 1882 •

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THE A. LIETZ CO.

Established 1882

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No. 1117 *TRANSVEL, Medium*

No. 1118 *TRANSVEL, Heavy*

No. 1122 *PLUMAS, Medium*

No. 1123 *PLUMAS, Heavy*

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No. 1130 *AVALON*

No. 1132 *EXPOSITION*

No. 1136 *TALLAC*

No. 1137 *SONORA*

No. 1140 *MADERA, Heavy*

No. 1005 *ORLAND*

No. 1070 *AVENA*

No. 1080 *MODOC*

No. 1081 *MOHAVE*

No. 1086-B *ELSINORE, Medium*

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CCA

MANUFACTURERS OF

ENGINEERING, SURVEYING, MINING *and* NAUTICAL INSTRUMENTS

DRAWING MATERIALS
FIELD EQUIPMENT



GENERAL CATALOG
17th Edition

THE A. LIETZ COMPANY

Established 1882

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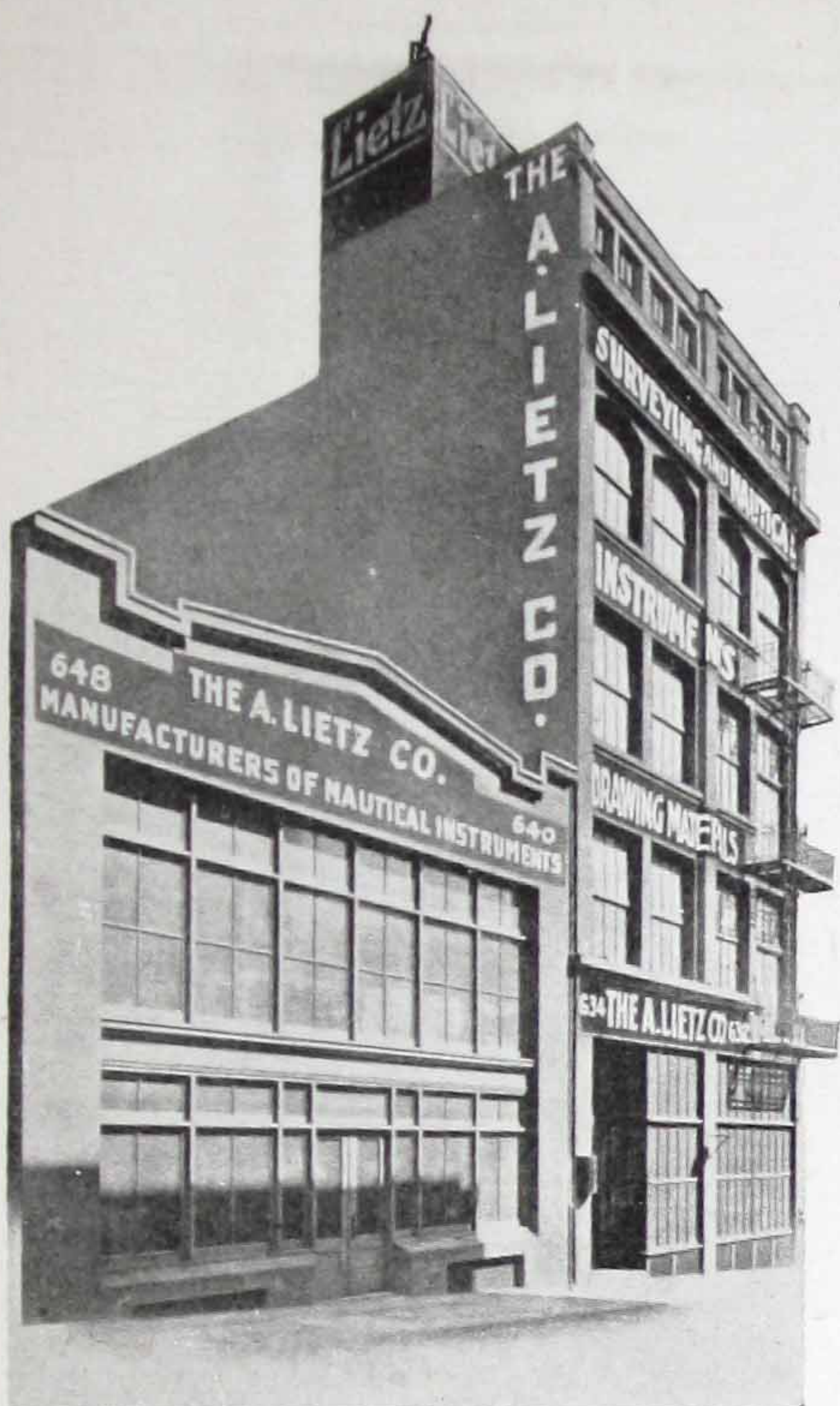
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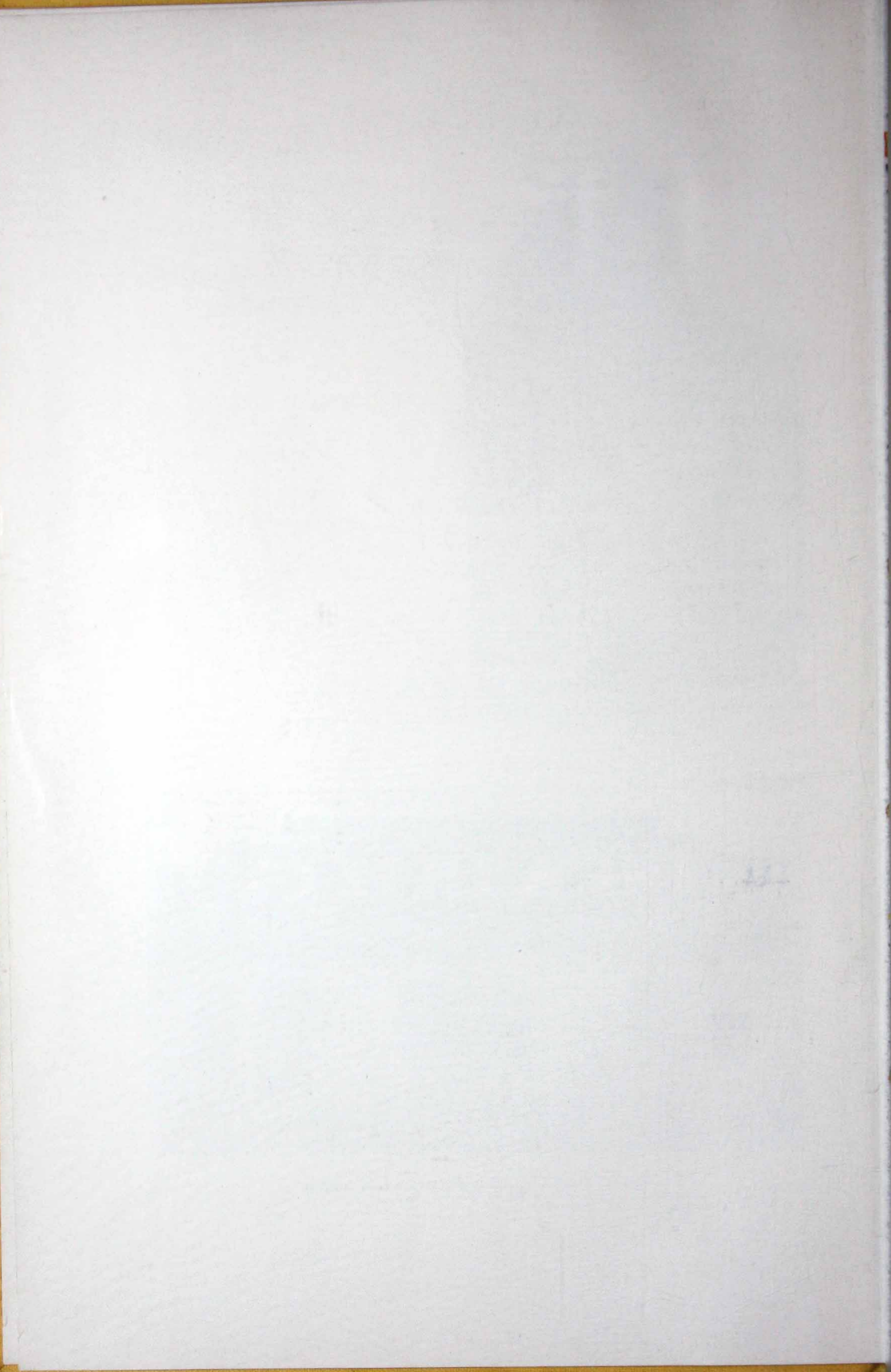
•
GENERAL OFFICE
AND
FACTORY

632 Commercial Street
San Francisco, Calif.

•



The A. Lietz Company Plant at Los Angeles



PREFACE

In presenting this catalog, our 17th edition, may we ask for it the same cordial reception given our previous editions.

This new catalog is carefully revised and corrected to date and supersedes all former editions.

The articles manufactured by this Company are quoted at prices consistent with their quality of workmanship and material. We endeavor to place before the public the very best that can be produced or obtained, without imitating in shape or design the products of other makers. All our articles are of the most recent standard, with every known improvement.

We are publishing this catalog without prices as, due to constant changes in the labor and material markets, prices are subject to change. A separate price list will be found in the back of this catalog and we shall issue revised price lists from time to time as necessity may demand.

We thank our many friends for their continued good will and patronage which has enabled us to grow and expand and it shall always be our endeavor to give our friends and patrons the best in service and to maintain our reputation for the absolute reliability of our products, which we are proud to state are today regarded as the very highest and best possible to obtain.

THE A. LIETZ COMPANY.

San Francisco, January, 1938.

TELEGRAPHIC CODE

When telegraphing orders our customers will find it convenient to use the code words which will be found opposite the item in our catalog.

Telegraph Address:

**THE A. LIETZ COMPANY, 632 COMMERCIAL STREET,
SAN FRANCISCO, CALIF.**

Cable Address: **CYCLOTOMIC, SAN FRANCISCO, U. S. A.**

Use **A. B. C., 5th Edition**, or **A. B. C., 5th Edition Improved**, or **Bentley's Codes** in connection with our private Code Words.

THE A. LIETZ COMPANY

NOTICE

When ordering from catalog please give numbers, the name and size of article. When telegraphing orders use code words for convenience.

Our prices are F. O. B. San Francisco or Los Angeles. Transportation on goods sent on memorandum, or for examination, is at the expense of the customer.

Please be careful to add the county and state to your address, making it, always, as clear as possible.

We make no charge for packing, except on foreign shipments requiring special cases and care. Unless otherwise ordered we shall use our best judgment in the way of shipping, and will prepay transportation if desired, adding amounts to your invoices.

We guarantee all goods sold by us, and any articles which do not prove satisfactory should be returned to us, and we will cheerfully rectify or replace.

It is our policy to please our customers, believing that satisfied patrons are our highest asset.

According to the rules of the Express Companies, a surveying instrument, carefully placed in its case and in a packing box, is shipped as merchandise and charged at "single rate." "Three rates" will be charged if this precaution be not taken. The customer should not omit, therefore, to pay strict attention to this rule and avoid unnecessary overcharges.

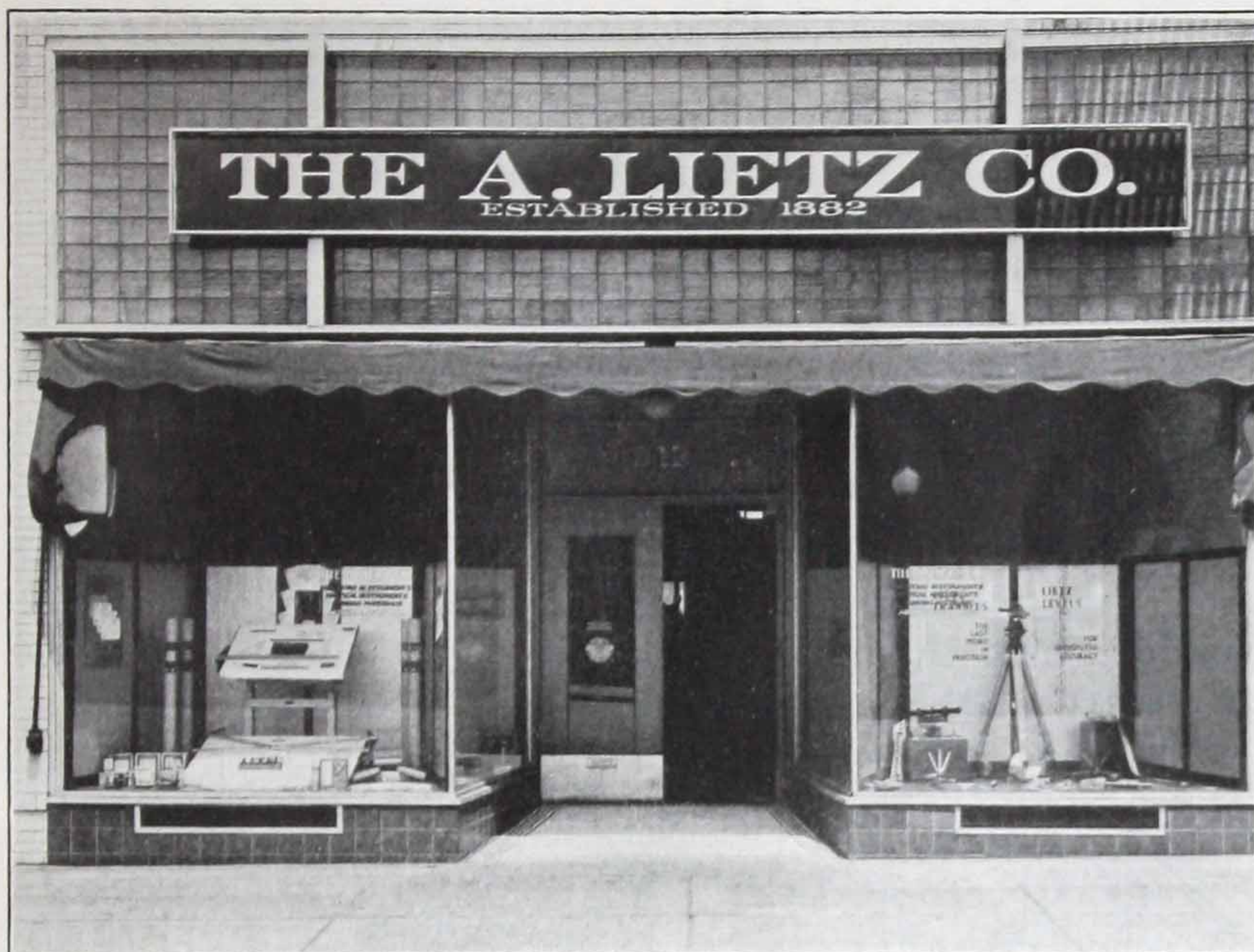
Packing boxes for surveying instruments are furnished by us at a nominal rate.

MODERN ENGINEERS' AND
SURVEYORS' INSTRUMENTS

THE A. LIETZ COMPANY

SAN FRANCISCO, U. S. A.

SALES BRANCHES AND AGENCIES



Lietz Instruments and Supplies may be obtained from our stores in SAN FRANCISCO, and LOS ANGELES, also from leading dealers in other cities in the United States, the Philippine Islands, Hawaii, Canada and Mexico.

Our branches carry a complete stock of all Lietz Instruments and Supplies and have in connection a modern repair shop in charge of experienced mechanics especially trained for repairs to Surveying Instruments of all makes and other Scientific Equipment.

THE A. LIETZ COMPANY

Established 1882

Store
SAN FRANCISCO
70 POST STREET

Main Office
SAN FRANCISCO
632 COMMERCIAL STREET

Store
LOS ANGELES
913 So. GRAND AVENUE

LIETZ INSTRUMENTS OF PRECISION FOR ENGINEERS AND SURVEYORS

FOREWORD

The manufacture of American engineer's instruments constitutes an industry of National importance, inasmuch as the construction of them is of specific American origin; which has made it possible from the beginning (in about 1832) to accomplish engineering problems with that amount of speed and obtain results within the limitations of accuracy which characterizes many of our American industrial problems.

It is realized that those American manufacturers who have devoted their efforts to the construction of first-class instruments only have been the pioneers in establishing the standardization of the American engineer's instruments of today.

It is also realized and fully established by experience that the first-class instrument is in any and every instance the most advantageous to use.

Economic efficiency can only be obtained with the use of first-class instruments which are kept in good working condition by keeping them out of the hands of the ordinary mechanic, who frequently attempts to make repairs which can only be executed by the manufacturer.

Lietz Transits, Levels and Alidades are precise, sensitive and strong and assure their purchasers a lasting satisfaction in the field and as an investment.

Quality evidenced since 1882.

REMARKS

We desire to convince our future customers—our old patrons we have long since convinced—that we are building conscientiously upon scientific principles, that every part and detail has been carefully studied to meet the requirements of our engineering fraternity, of the climate, and of all those conditions that influence the shape and character of every feature of the surveying instrument. It must permit of all operations at the

least expenditure of time, it must be compact, it must be light, it must be absolutely accurate, it must be rigid, it must be stable and it must possess strength. And wherever a possible improvement is suggested in any detail, it must be applied at once and tested as to its probable merits, and if it prove of value, no time must be lost in introducing it. These are the principles that have governed the manufacture of Lietz Instruments since the beginning in 1882.

Improvements have always had our attention, without any regard of the expenses incurred in experimenting.

With the object constantly in view to make only the very best article that can be produced, and ever ready to introduce improvements and to experiment with suggestions that may lead to them, our instruments are held at a price that is commensurate with their qualities. Their values are rated by those current among first-class instrument makers; they are *no more*, but they are *no less*. We do not handle cheap goods, and the trade that we are most anxious to please is that *willing to pay a fair price for a first-class article*.

It is our purpose to describe in this catalog only the instruments for which there exists the greatest demand. We are prepared to make changes which individual purchasers may require and to add any special features.

Theodolites of the highest grade and for the most exacting purpose, reading with micrometers to the most refined division are made upon order to any desired shape or design and with every required accessory.

Extra features and adjustments for instruments are listed on pages 44 and 45.

All standard Lietz transits and levels are furnished with base plate and tripod head having a thread $3\frac{1}{2}$ " in diameter, 8 threads to the inch, in accordance with recommendations of the Manufacturers Sub Committee, Bureau of Standards, United States Department of Commerce.

THE A. LIETZ COMPANY

SAN FRANCISCO, U. S. A.

MODERN ENGINEERS' AND
SURVEYORS' INSTRUMENTS

SPECIFICATIONS OF LIETZ TRANSITS AND THEODOLITES

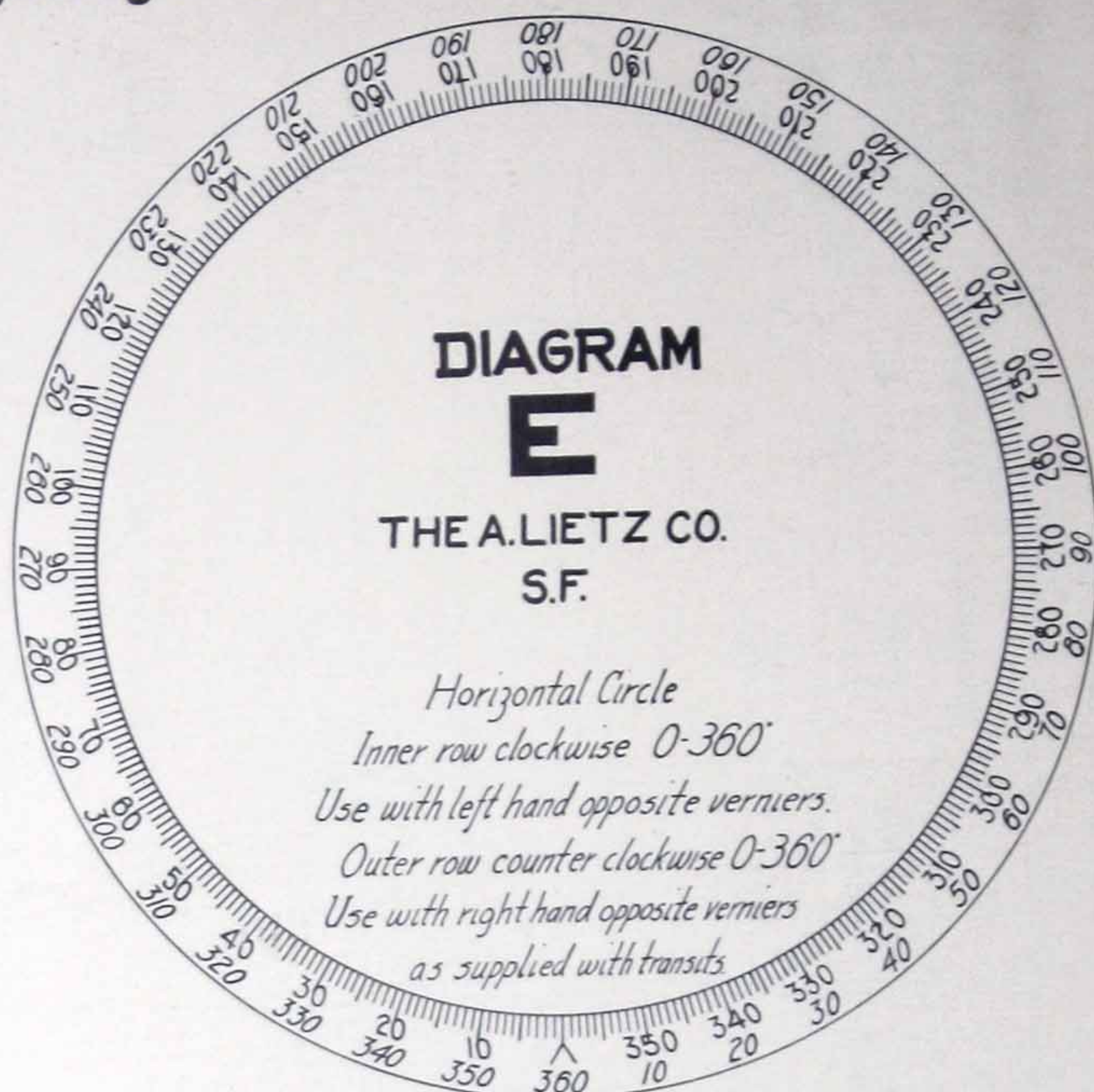
Page No.	Catalog No.	Horizontal Limb		Vertical Limb		Telescope				Compass Needle Length	Sensitiveness		Leveling Screws	Weight	
		Diam.	Reads to	Vertical Circle	Vertical Arc	Eyepiece	Length	Object Diam.	Power		Telescope Level	Plate Level		Instru- ment	Tripod
19	2	in. 6 1/4	1 min.	in.	in.	Erect.	in. 11 1/2	in. 1 3/8	24	in. 4 3/8	sec. 30	sec. 60	4	lb. 15	lb. 11
21	3	"	"	.....	5	"	"	"	"	"	"	"	"	16	"
23	4	"	"	.....	.....	"	"	"	"	"	"	"	"	"	"
25	5	"	30 sec.	.....	.....	"	"	"	"	.....	"	30	"	"	"
27	5E	"	1 min.	.....	.....	"	"	"	"	3 1/2	"	60	"	"	"
29	5F	7	10 sec.	.....	.....	"	"	"	"	"	"	30	"	18	"
31	5G	"	"	.....	.....	Invert	13	"	25-35	.....	20	"	3	26	17
33	6	5 1/2	1 min.	.....	.....	Erect.	10 1/2	"	20	3 1/2	30	60	4	13	11
35	8	5	"	.....	4	"	8 1/2	1 1/8	18	"	"	"	"	11	13
37	9	"	"	.....	.....	"	"	"	"	"	"	"	"	"	"
39	11E	"	"	.....	.....	"	"	"	"	2 1/2	"	"	"	"	"
41	12	4	"	.....	.....	"	"	"	"	"	"	"	"	9	"

SPECIFICATIONS OF LIETZ LEVELS AND ALIDADES

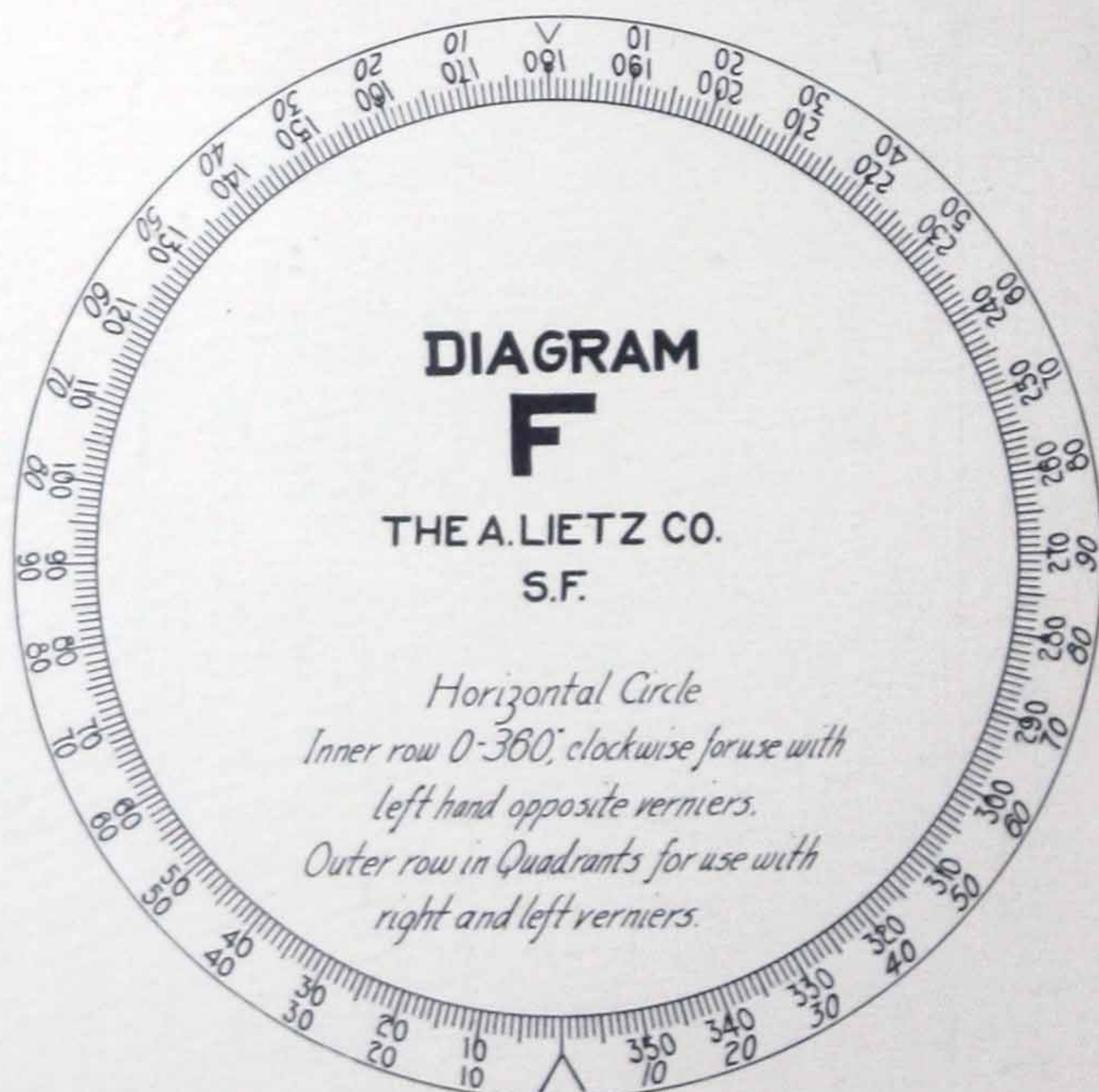
Page No.	Catalog No.	Type	Telescope				Sensitiveness of Spirit Level	Number of Leveling Screws	Weight	
			Eyepiece	Length	Obj. Diameter	Magnification			Inst.	Tripod
51	19	Wye	Erect.	in. 18	in. 1 5/8	32X	sec. 20	4	lbs. 12	lbs. 11
53	19G	"	"	"	"	"	15	"	13	16
55	20T	Dumpy	"	"	"	"	20	"	10	11
57	20G	Precise	Invert.	17	1 3/4	40X	2	3	14	19

65	30	Alidade	Invert.	15	1 3/8	35X	30	.....	8 1/2	.....
67	31	"	Erect.	11	1 3/16	24X	"	.....	7	.....
69	32	"	"	8 1/2	1	18X	"	.....	6	.....
70	33	"	Invert.	"	1	10.8X	"	.....	"	.....
70	33A	"	"	"	1	18X	"	.....	"	.....

Figuring of Graduations of Horizontal Circles

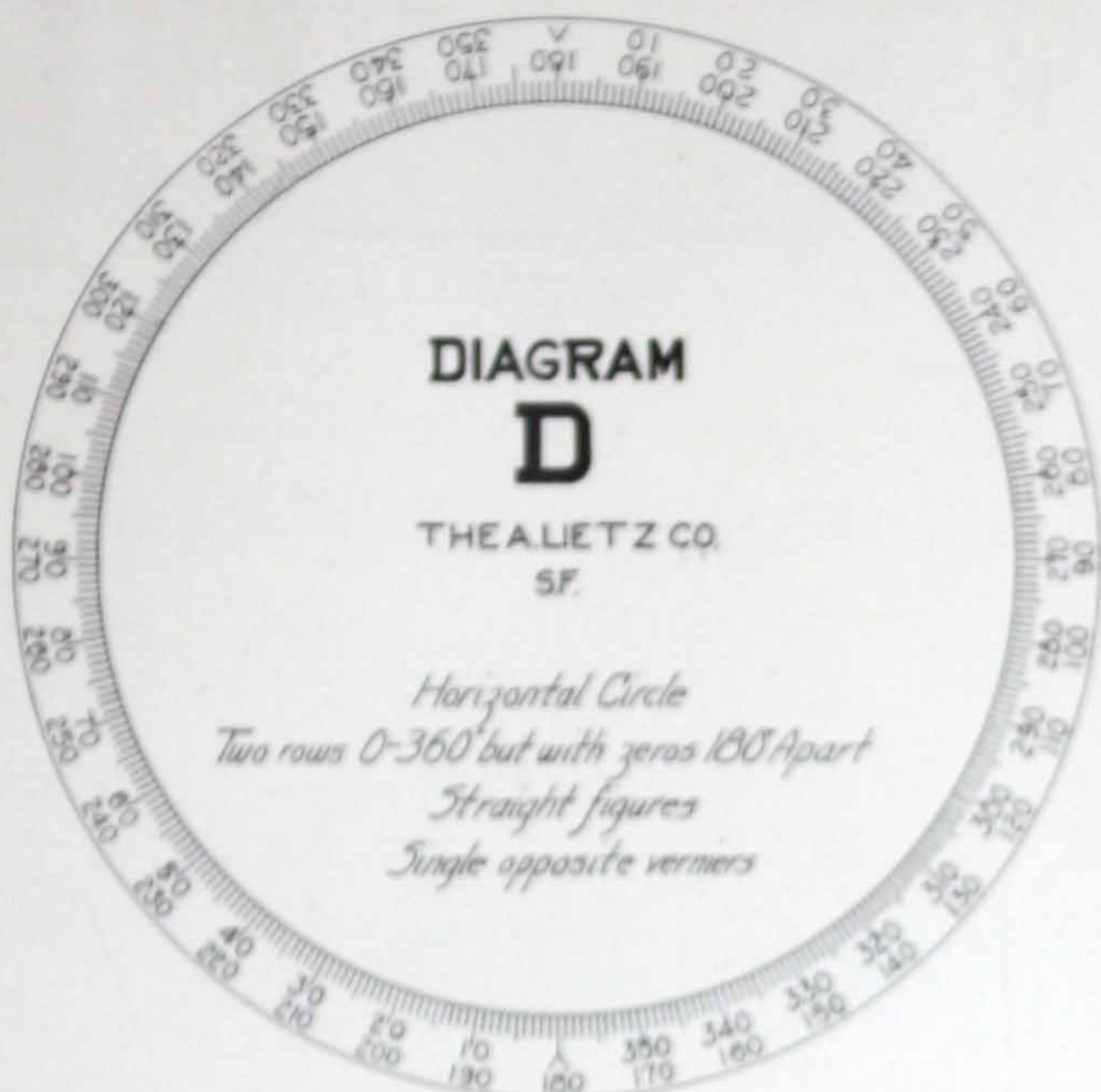


Customary style. Always carried in stock.

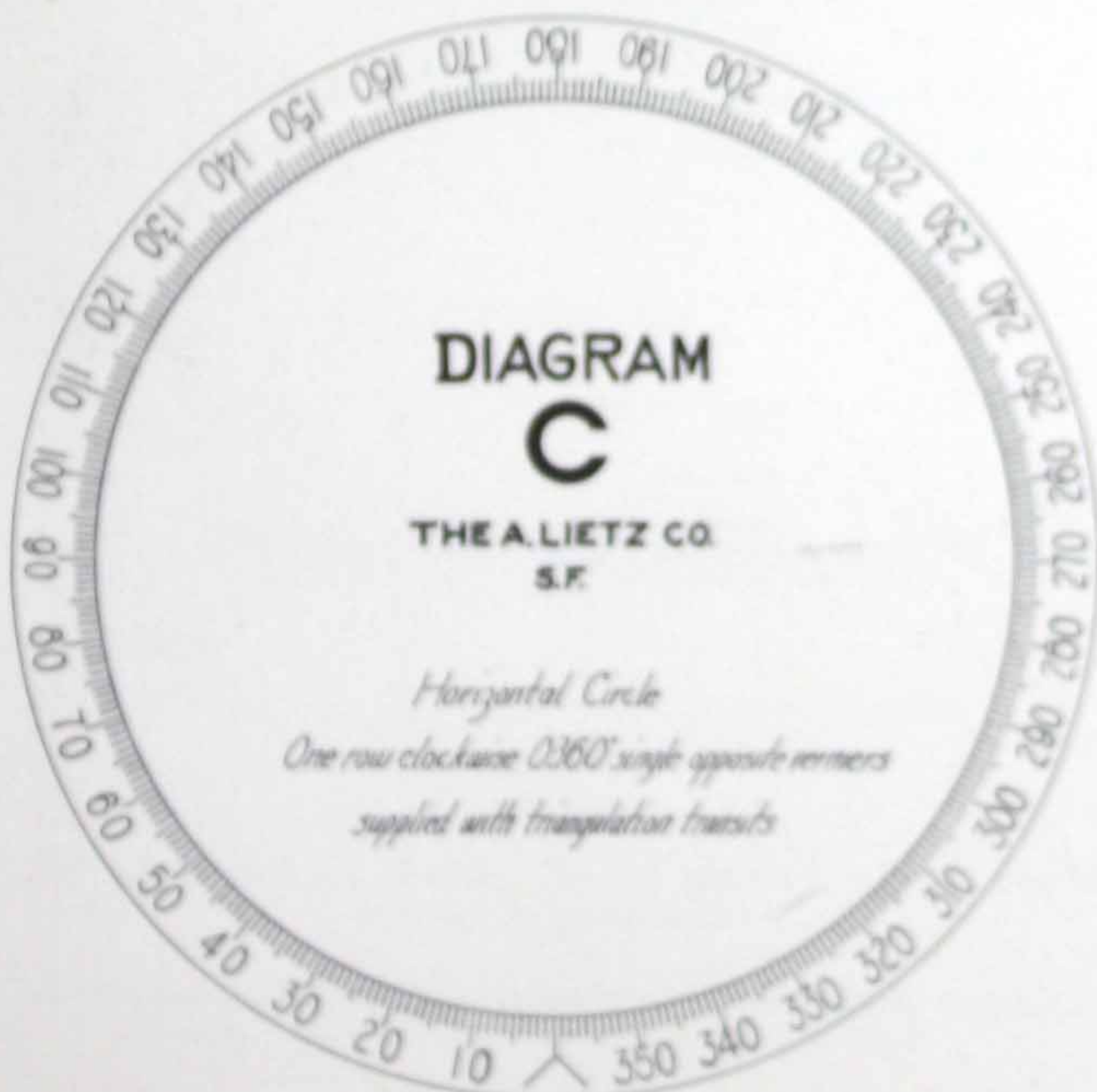


Made to order only.

Figuring of Graduations of Horizontal Circles

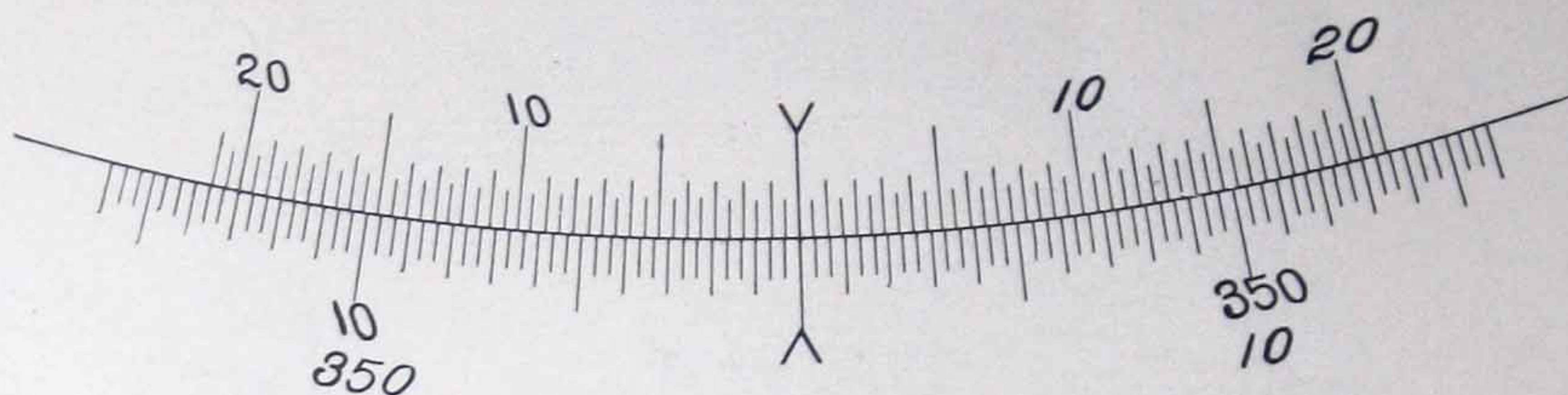


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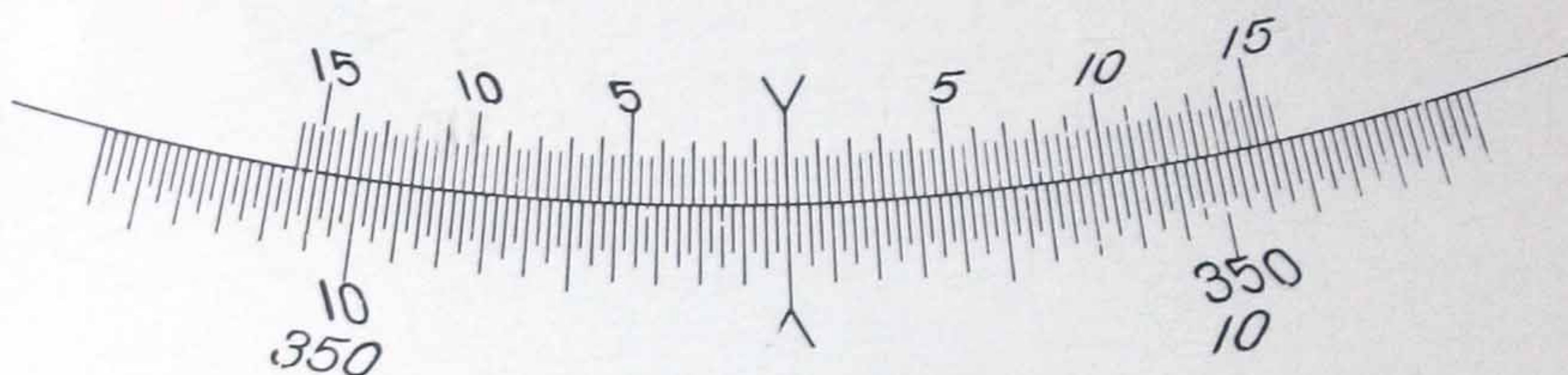
Made to order only.

METHODS OF GRADUATING LIETZ INSTRUMENTS



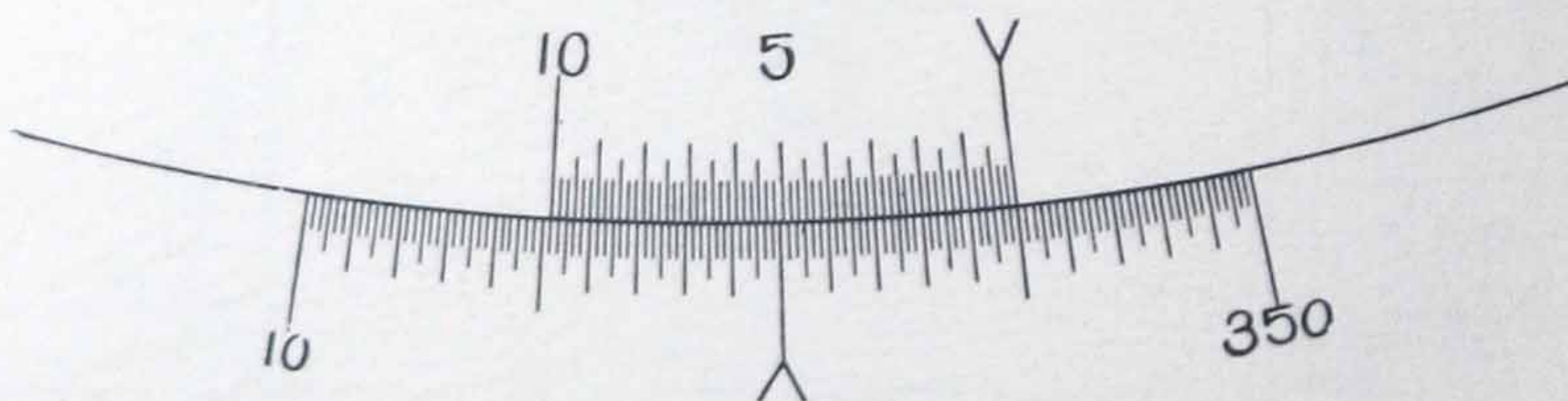
No. 1

Double vernier reading to 30". Circle graduated to 20'.



No. 2

Double vernier reading to 20". Circle graduated to 15'.

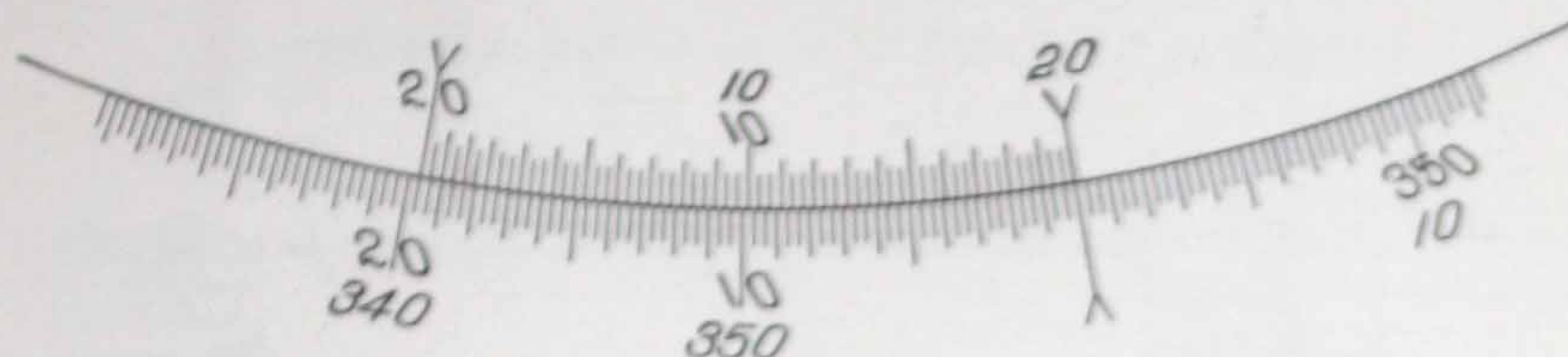


No. 3

Single vernier reading to 10". Circle graduated to 10'.
With one row of figures.

When desired we can furnish double opposite verniers with two rows of figures on limb from 0° to 360° in opposite directions.

AND POPULAR STYLES OF VERNIERS FURNISHED



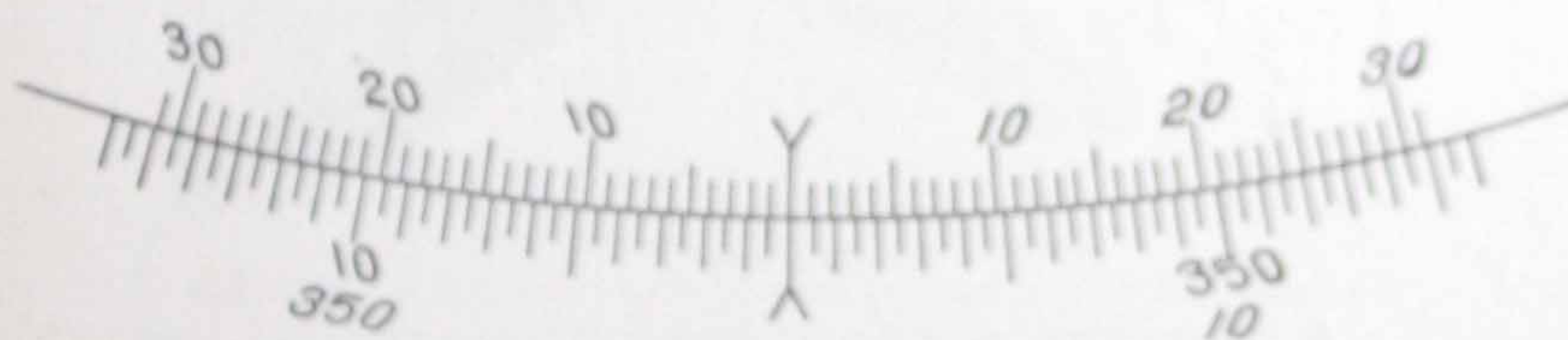
No. 4

Single vernier reading to 20". Circle graduated to 20'.
With two rows of figures.



No. 5

Folding vernier reading to 20". Circle graduated to 20'.
With two rows of figures.

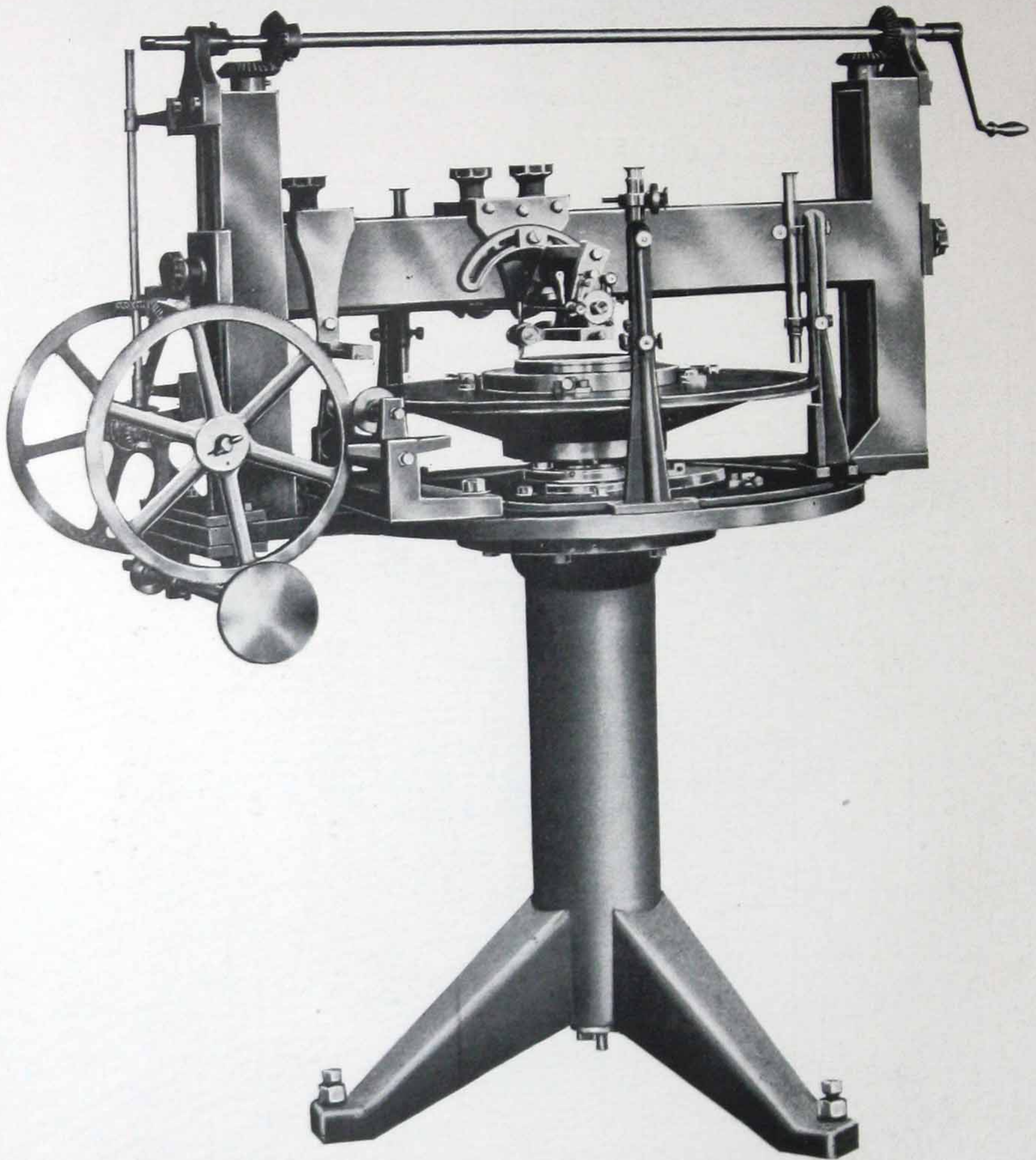


No. 6

Double vernier reading to single minutes. Circle graduated to 30'.

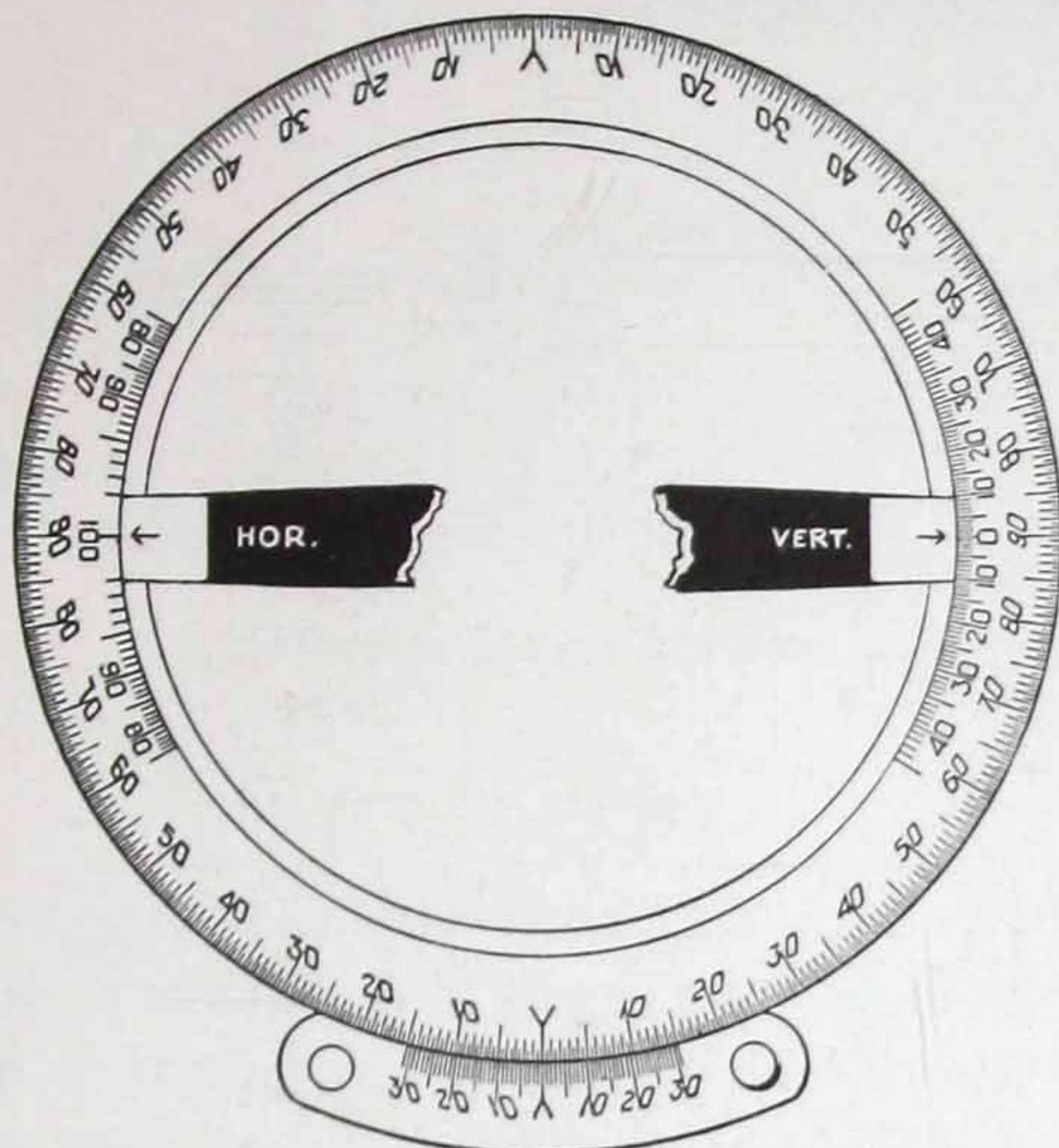
CIRCULAR DIVIDING ENGINE

Built by The A. Lietz Co. for the Graduating Department



We are in position to regraduate the arcs or circles of all makes of surveying instruments; also sextants, octants, protractors, etc. Prices on application.

SPECIAL FEATURES AND ADDITIONS FOR LIETZ INSTRUMENTS



THE STADIA CIRCLE

This device consists essentially of two graduated scales on the inside circumference of the vertical circle as follows:

"Hor." A scale for reducing inclined stadia readings to horizontal.

"Vert." A scale for determining differences in elevation (Vertical Distances).

Each of these special scales has an index. The left index is marked "Hor." and by it is obtained the multiplier which can be applied to the stadia distance to obtain the horizontal distance. The right index is marked "Vert." and is used to obtain the multiplier which applied to the observed stadia distance obtains the difference in elevation.

The Stadia Circle... **CULTAG**

When fitted to used transit additional charge is made.

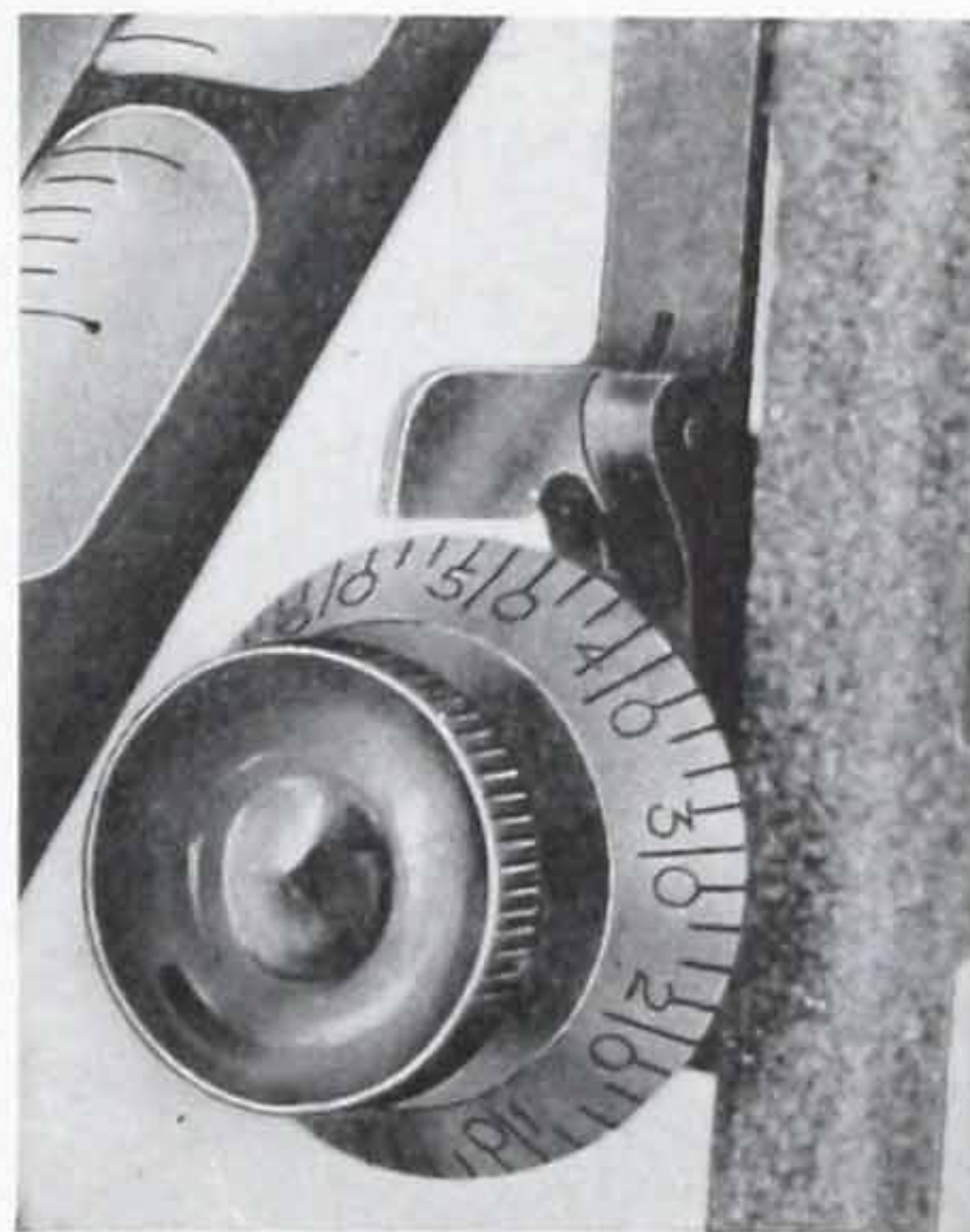
THE GRADIENTER

The head of the tangent screw of the vertical arc movement is made somewhat larger, properly silvered and graduated into a number of equal parts on its circumference, the thread of the screw being cut with great precision, so that its revolution may be accurately recorded by the divisions of the micrometer head.

One complete revolution of the screw corresponds to 5/10 of a foot of difference in level in 100 feet. Since the head is divided into fifty parts, it follows that one division equals a difference of 1/100 of a foot in 100 feet. We furnish this with a movable head admitting a zero setting.

Gradienter Attachment to Vertical Motion supplied with movable head which admits zero setting.

Code Word..... **CULPABLE**



STABILITY AND RIGIDITY OF LIETZ INSTRUMENTS



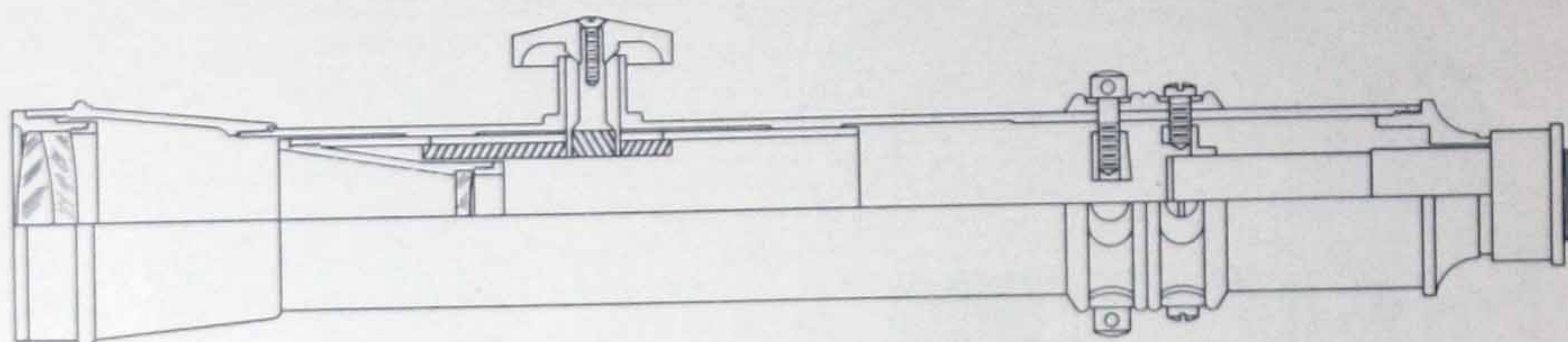
CONNECTING BAR

This is accomplished through the correct design of the various parts and through the use of properly alloyed metals which are treated by a heat process before the finer fitting is done, thus removing all strain. We also have special collimating apparatus whereby we test the completed instrument under various temperature changes to assure stability of adjustments. All clamps and other essential parts are ribbed assuring great strength. The lower clamp and tangent piece has a **connecting bar** which adds materially to stability and rigidity, particularly necessary for angular repetitions. (See cut).

SEE PRICE LIST IN BACK OF CATALOG

15

LIETZ TELESCOPES



Cross Section of Lietz Telescope with Internal Focusing System.

1. Internal Focusing System

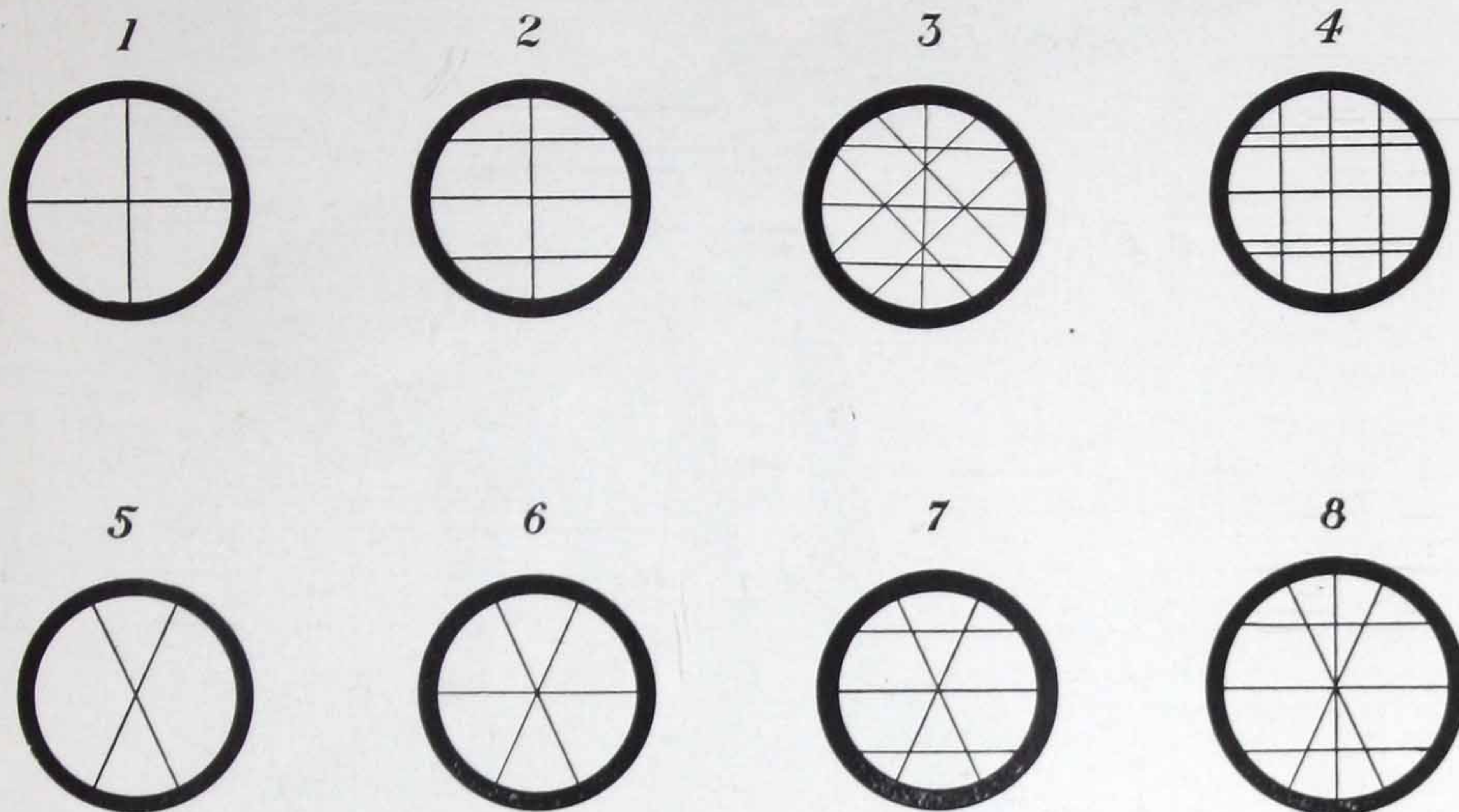
The standard Lietz transits and levels are furnished with the improved Lietz internal focusing telescope. The main tube is one piece closed at one end by the objective lens the position of which remains unchanged in relation to the cross hairs. The focusing is accomplished by moving an auxiliary lens. The other end of the telescope is closed by the eyepiece. This design of construction is practically dust and moisture proof. The moving parts are near the center of the telescope which therefore remains in better balance.

A large objective aperture gives a brilliant image. The Lietz internal focusing telescope has an exceptionally flat field and superior definition. On the Lietz internal focusing telescope the usual instrument constant need not generally be considered since all stadia measurements will give the distance from the center of the instrument directly without having to apply the usual instrument constant ($F+C$); the stadia hair interval on the rod when multiplied by 100 will give the distance from the center of the instrument to the rod and while the constant multiplier (100) varies according to the distance, the error involved is negligible and much less than the error of reading the stadia rod interval.

2. External Focusing System

While the standard Lietz transits and levels are now supplied with the internal focusing telescope we are prepared on special order to furnish Lietz instruments with telescopes having the exterior system of focusing.

CROSS HAIRS



We have superior facilities for setting cross hairs with great precision. The cuts show the different cross hairs we set in our instruments as ordered. When ordering please indicate by number the cross hairs wanted as shown above. Unless otherwise specified we employ No. 1 cross hairs and No. 2 stadia hairs.

NEW DIAPHRAGMS WITH CROSS AND STADIA HAIRS

(Furnished complete with Cross Hair Frame Screws)

	Code Word
New Diaphragm with Cross Hairs only (design No. 1).....	CYCLIC
New Diaphragm with Cross and Stadia Hairs (design No. 2).....	CYCLOM
New Diaphragm with Hairs, Special Design.....	CYCLONE

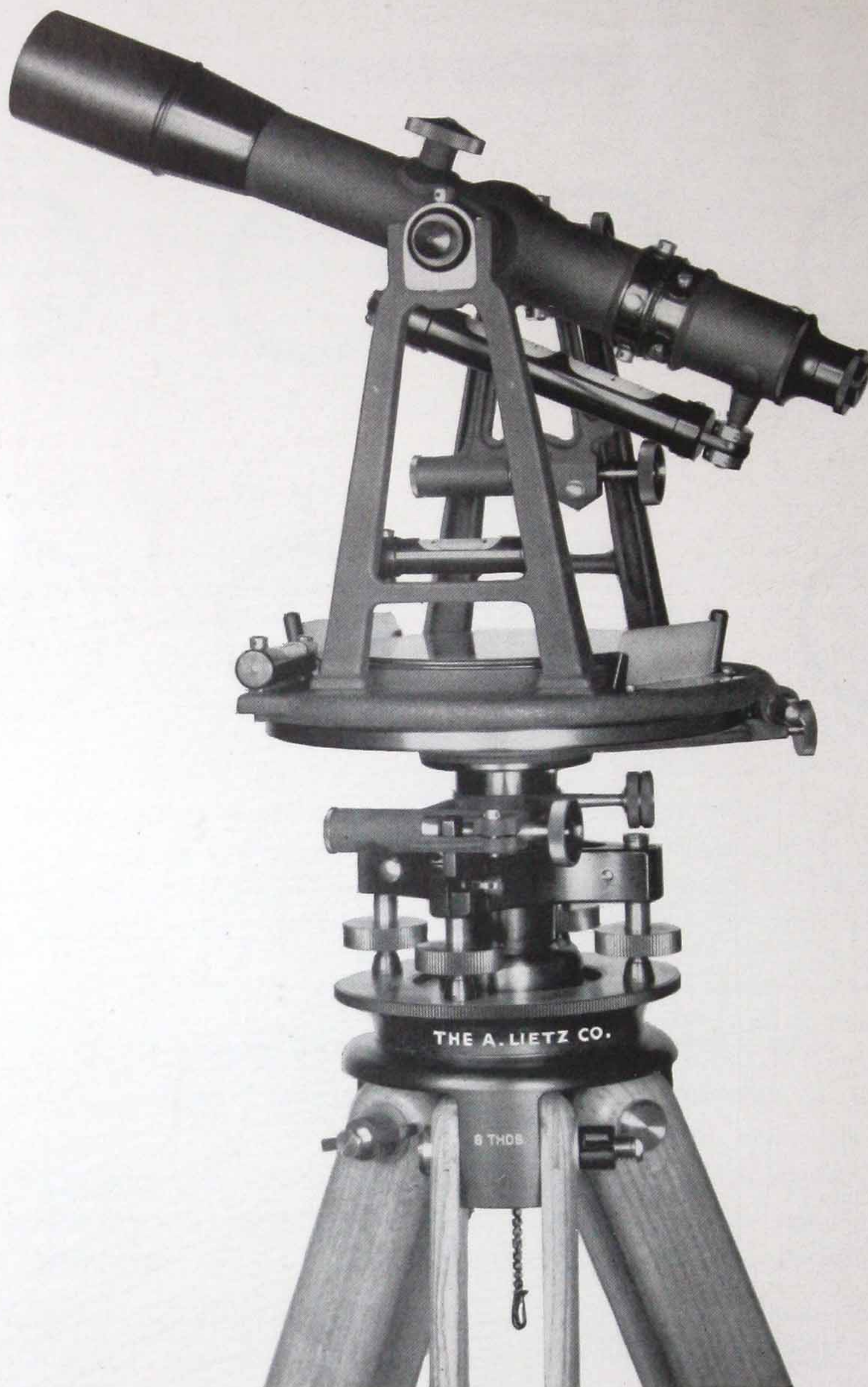
When ordering Diaphragm with Special Cross Hairs please refer to top of page and state DESIGN NUMBER required.

For Level Vials and Housing see page 59.

SEE PRICE LIST IN BACK OF CATALOG

THE A. LIETZ COMPANY
SAN FRANCISCO, U. S. A.

MODERN ENGINEERS' AND
SURVEYORS' INSTRUMENTS



No. 2

LIETZ 6 1/4-INCH ENGINEERS' PRECISION TRANSIT

Fitted with level and tangent to telescope.

Code Word, **BUGGY**

LIETZ ENGINEERS' TRANSIT No. 2

SPECIFICATIONS

Horizontal Limb— $6\frac{1}{4}$ inches diameter at edge of graduation. Graduated on heavy ring of solid silver, two rows of figures 0° to 360° in opposite directions; figures inclined in the direction verniers should be read; double opposite verniers reading to one minute set at about 30° from the line of collimation, with ground glass shades. Two fine spirit levels graduated on glass, sensitiveness about 60 seconds.

Telescope— $11\frac{1}{2}$ inches long. Object glass $1\frac{3}{4}$ in., INTERNAL FOCUSING, spiral rack and pinion movement, erecting eyepiece, MAGNIFYING POWER 24 diameters, STADIA HAIRS fixed, ratio 1:100 reading direct from center of instrument. Spirit level $4\frac{1}{2}$ inches long, graduated on glass, sensitiveness about 30 seconds. Improved CLAMP and TANGENT SCREW to telescope.

Compass—Numbered in quadrants; graduated to half degrees with VARIATION RING. GOLD PLATED NEEDLE $4\frac{3}{4}$ inches long having highest degree of permanent magnetic force, jeweled center and improved lifting arrangement, watertight and removable cover glass.

Centers—Of hard bronze anti-friction alloys, long tapered and closely fitted they are stout and unyielding. FOUR LEVELING SCREWS of special composition metal with deep threads. SHIFTING CENTER to set instrument exactly over given point. Improved CLAMP and TANGENT PIECE with connecting bar. (See page 15). Tangent screws with counterspring.

Center Mark—On top of telescope for setting transit under point above.

Finish—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.

Tripod—Split-leg. Base Plate and tripod head having a thread $3\frac{1}{4}$ " in diameter, 8 threads to the inch (U. S. Standard).

Accessories—Plumb bob, reading glass, sunshade, adjusting pins, dust brush and screw driver, polished mahogany case with lock, key and strap.

Weight—Transit about 15 lbs. Tripod about 11 lbs.

Gross Weight—Transit and Tripod packed securely for shipment in two boxes about 65 lbs.

Code Word—BUGGY.

Extras for Transit No. 2

For which the additional charge is made. Kindly specify if desired.

	Code Word
Horizontal verniers reading to 30 seconds.....	CULLYISM
Reversion level vial with protection ring.....	CULTURE
Full extension tripod in lieu of straight legs.....	CUMBRANCE
Silk protection bag or hood (waterproof).....	CURTAIN
Bottle of fine instrument oil.....	CUTEX
Inverting eyepiece (made to order only).....	CUTWATER

For complete list of features applicable to Lietz Transits see pages 44 and 45.

SEE PRICE LIST IN BACK OF CATALOG

THE A. LIETZ COMPANY
SAN FRANCISCO, U. S. A.

MODERN ENGINEERS' AND
SURVEYORS' INSTRUMENTS



No. 3

LIETZ 6 1/4-INCH ENGINEERS' PRECISION TRANSIT

With 5-inch Vertical Arc and double vernier reading to minutes.

Code Word, **BUGLEHORN**

LIETZ ENGINEERS' TRANSIT No. 3

SPECIFICATIONS

Horizontal Limb— $6\frac{1}{4}$ inches diameter at edge of graduation. Graduated on heavy ring of **solid silver**, two rows of figures 0° to 360° in opposite directions; figures inclined in the direction verniers should be read; double opposite verniers reading to one minute set at about 30° from the line of collimation, with **ground glass shades**. Two fine **spirit levels** graduated on glass, sensitiveness about 60 seconds.

Vertical Arc—5 inches diameter, graduated on solid silver, double vernier reading to one minute.

Telescope— $11\frac{1}{2}$ inches long, Object glass $1\frac{3}{8}$ in., INTERNAL FOCUSING, spiral rack and pinion movement, erecting eyepiece, MAGNIFYING POWER 24 diameters. STADIA HAIRS fixed, ratio 1:100 reading direct from center of instrument. Spirit level $4\frac{1}{2}$ inches long, graduated on glass, sensitiveness about 30 seconds. Improved CLAMP and TANGENT SCREW to telescope.

Compass—Numbered in quadrants; graduated to half degrees with VARIATION RING. GOLD PLATED NEEDLE $4\frac{3}{8}$ inches long having highest degree of permanent magnetic force, jeweled center and improved lifting arrangement, watertight and removable cover glass.

Centers—Of hard bronze anti-friction alloys, long tapered and closely fitted they are stout and unyielding. FOUR LEVELING SCREWS of special composition metal with deep threads. SHIFTING CENTER to set instrument exactly over given point. Improved CLAMP and TANGENT PIECE with connecting bar. (See page 15). Tangent screws with counterspring.

Center Mark—On top of telescope for setting transit under point above.

Finish—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.

Tripod—Split-leg. Base Plate and tripod head having a thread $3\frac{1}{2}$ " in diameter, 8 threads to the inch (U. S. Standard).

Accessories—Plumb bob, reading glass, sunshade, adjusting pins, dust brush and screw driver, polished mahogany case with lock, key and strap.

Weight—Transit about 16 lbs. Tripod about 11 lbs.

Gross Weight—Transit and Tripod packed securely for shipment in two boxes about 65 lbs.

Code Word—BUGLEHORN.

Extras for Transit No. 3

For which the additional charge is made. Kindly specify if desired.

	Code Word
Horizontal verniers reading to 30 seconds.....	CULLYISM
Reversion level vial with protection ring.....	CULTURE
Gradienter attachment to vertical motion with movable head.....	CULPABLE
Prism to eyepiece, with neutral glass.....	CUMBERSOME
Colored object glass cap in lieu of ordinary.....	CUTLERY
Full extension tripod in lieu of straight legs.....	CUMBRANCE
Silk protection bag or hood (waterproof).....	CURTAIN
Bottle of fine instrument oil.....	CUTEX
Inverting eyepiece (made to order only).....	CUTWATER

For complete list of features applicable to Lietz Transits see pages 42-45.

SEE PRICE LIST IN BACK OF CATALOG

THE A. LIETZ COMPANY
SAN FRANCISCO, U. S. A.

MODERN ENGINEERS' AND
SURVEYORS' INSTRUMENTS



No. 4

LIETZ 6 1/4-INCH COMPLETE ENGINEERS' TRANSIT

With 5-inch full Vertical Circle and double vernier reading to minutes.

Code Word, **BUGLER**

LIETZ ENGINEERS' TRANSIT No. 4

SPECIFICATIONS

- Horizontal Limb**— $6\frac{1}{4}$ inches diameter at edge of graduation. Graduated on heavy ring of **solid silver**, two rows of figures 0° to 360° in opposite directions; figures inclined in the direction verniers should be read; double opposite verniers reading to one minute set at about 30° from the line of collimation, with **ground glass shades**. Two fine **spirit levels** graduated on glass, sensitiveness about 60 seconds.
- Vertical Circle**—5 inches diameter, graduated on solid silver, double vernier reading to one minute, fitted with removable guard.
- Telescope**— $11\frac{1}{2}$ inches long, Object glass $1\frac{3}{8}$ in., INTERNAL FOCUSING, spiral rack and pinion movement, erecting eyepiece, MAGNIFYING POWER 24 diameters. STADIA HAIRS fixed, ratio 1:100 reading direct from center of instrument. Spirit level $4\frac{3}{8}$ inches long, graduated on glass, sensitiveness about 30 seconds. Improved CLAMP and TANGENT SCREW to telescope.
- Compass**—Numbered in quadrants; graduated to half degrees with VARIATION RING. GOLD PLATED NEEDLE $4\frac{3}{8}$ inches long having highest degree of permanent magnetic force, jeweled center and improved lifting arrangement, watertight and removable cover glass.
- Centers**—Of hard bronze anti-friction alloys, long tapered and closely fitted they are stout and unyielding. FOUR LEVELING SCREWS of special composition metal with deep threads. SHIFTING CENTER to set instrument exactly over given point. Improved CLAMP and TANGENT PIECE with connecting bar. (See page 15). Tangent screws with counterspring.
- Center Mark**—On top of telescope for setting transit under point above.
- Finish**—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.
- Tripod**—Split-leg. Base Plate and tripod head having a thread $3\frac{1}{2}$ " in diameter, 8 threads to the inch (U. S. Standard).
- Accessories**—Plumb bob, reading glass, sunshade, adjusting pins, dust brush and screw driver, polished mahogany case with lock, key and strap.
- Weight**—Transit about 16 lbs. Tripod about 11 lbs.
- Gross Weight**—Transit and Tripod packed securely for shipment in two boxes about 65 lbs.
- Code Word**—BUGLER.

Extras for Transit No. 4

For which the additional charge is made. Kindly specify if desired

	Code Word
Horizontal verniers reading to 30 seconds.....	CULLYISM
Horizontal verniers reading to 20 seconds.....	CULMINATE
Reversion level vial with protection ring.....	CULTURE
Gradiometer attachment to vertical motion with movable head....	CULPABLE
Disappearing stadia hairs.....	CUPRIC
Prism to eyepiece, with neutral glass.....	CUMBERSOME
Colored object glass cap in lieu of ordinary.....	CUTLERY
Full extension tripod in lieu of straight legs.....	CUMBRANCE
Silk protection bag or hood (waterproof).....	CURTAIN
Bottle of fine instrument oil.....	CUTEX
Inverting eyepiece (made to order only).....	CUTWATER

For complete list of features applicable to Lietz Transits see pages 42-45.

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No. 5

LIETZ 6 1/4-INCH TRANSIT THEODOLITE

With U-shaped Standards, Y Bearings, without Compass.
Code Word, **BULLFISH**

No. 5C

Same as No. 5 but with Circular Compass 3 1/2 inches diameter
with Variation Ring
Code Word, **BULLETIN**

LIETZ TRANSIT THEODOLITE No. 5

With U-shaped Standards and Y Bearings

Lietz Transit Theodolite No. 5 has U-shaped standards of improved design, consisting of a one-piece casting. This U-shaped telescope support gives great stability in the upper structure, where lateral rigidity is most essential. The telescope has cylindrical pivots, which rest in wye bearings. This secures great refinement of motion in a vertical plane, and without stress. The telescope is reversible in position and exchangeable in its bearings, which are provided with dust caps and screws to give the necessary friction.

SPECIFICATIONS

Horizontal Limb—6 $\frac{1}{4}$ inches diameter at edge of graduation. Graduated on heavy ring of solid silver, two rows of figures 0° to 360° in opposite directions; figures inclined in the direction verniers should be read; double opposite verniers reading to 30 seconds set at about 30° from the line of collimation, with ground glass shades. Two fine spirit levels graduated on glass, sensitiveness about 30 seconds.

Vertical Circle—5 inches diameter, graduated on solid silver, double vernier reading to one minute, fitted with removable guard.

Telescope—11 $\frac{1}{2}$ inches long, Object glass 1 $\frac{3}{4}$ in., INTERNAL FOCUSING, spiral rack and pinion movement, erecting eyepiece, MAGNIFYING POWER 24 diameters, STADIA HAIRS fixed, ratio 1:100 reading direct from center of instrument. Spirit level 4 $\frac{1}{2}$ inches long, graduated on glass, sensitiveness about 30 seconds. Improved CLAMP and TANGENT SCREW to telescope.

Centers—Of hard bronze anti-friction alloys, long tapered and closely fitted they are stout and unyielding. FOUR LEVELING SCREWS of special composition metal with deep threads. SHIFTING CENTER to set instrument exactly over given point. Improved CLAMP and TANGENT PIECE with connecting bar. (See page 15). Tangent screws with counterspring.

Center Mark—On top of telescope for setting transit under point above.

Finish—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.

Tripod—Split-leg. Base Plate and tripod head having a thread 3 $\frac{1}{2}$ " in diameter, 8 threads to the inch (U. S. Standard).

Accessories—Plumb bob, reading glass, sunshade, adjusting pins, dust brush and screw driver, polished mahogany case with lock, key and strap.

Weight—Transit about 16 lbs. Tripod about 11 lbs.

Gross Weight—Transit and Tripod packed securely for shipment in two boxes about 65 lbs.

Code Word—BULLFISH.

No. 5C. Same as No. 5 but with circular compass with variation ring and compass needle 3 $\frac{1}{2}$ inches long. Code Word, BULLETIN

Extras for Transit No. 5 and 5C

For which the additional charge is made. Kindly specify if desired.

	Code Word
Horizontal verniers reading to 20 seconds.....	CULMINATE
Reversion level vial with protection ring.....	CULTURE
Striding level to axis of telescope.....	CULTRATED
Gradienter attachment to vertical motion with movable head.....	CULPABLE
Opposite double verniers to vertical circle reading to minutes (in lieu of single vernier).....	CURATIVE
Two vernier microscopes.....	CURBING
Compass needle in box on plate 4 $\frac{1}{2}$ inches long.....	CURBLES
Full extension tripod in lieu of straight leg.....	CUMBRANCE
Silk protection bag or hood (waterproof).....	CURTAIN

For complete list of features applicable to Lietz Transits see pages 42 and 45.

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THE A. LIETZ COMPANY
SAN FRANCISCO, U. S. A.

MODERN ENGINEERS' AND
SURVEYORS' INSTRUMENTS



No. 5E

LIETZ 6 1/4-INCH TRANSIT THEODOLITE

With 6 1/4-inch Horizontal Circle and 5-inch full Vertical Circle.
Code Word, **BUNTLINE**

SEE PRICE LIST IN BACK OF CATALOG

LIETZ TRANSIT THEODOLITE No. 5E

Lietz Transit Theodolite No. 5E has been constructed so as to obtain the highest amount of stability in the upper structure where lateral rigidity is most essential. **The U-shaped telescope support** is of a superior design, consisting of a one-piece casting with large circular base, which makes a more substantial connection to the upper plate and which also permits of a circular compass with variation ring and a compass needle $3\frac{1}{2}$ inches long. The sectional shape of this piece is of the "even cross" design, a characteristic of Lietz Instruments in all parts where the greatest stability is desirable with the least amount of material and weight.

SPECIFICATIONS

- Horizontal Limb**— $6\frac{1}{4}$ inches diameter at edge of graduation. Graduated on heavy ring of **solid silver**, two rows of figures 0° to 360° in opposite directions; figures inclined in the direction verniers should be read; double opposite verniers reading to one minute set at about 30° from the line of collimation, with **ground glass shades**. Two fine **spirit levels** graduated on glass, sensitiveness about 60 seconds.
- Vertical Circle**—5 inches diameter, graduated on solid silver, double vernier reading to one minute, fitted with removable guard.
- Telescope**— $11\frac{1}{2}$ inches long, Object glass $1\frac{3}{8}$ in., INTERNAL FOCUSING, spiral rack and pinion movement, erecting eyepiece, MAGNIFYING POWER 24 diameters. STADIA HAIRS fixed, ratio 1:100 reading direct from center of instrument. Spirit level $4\frac{1}{2}$ inches long, graduated on glass, sensitiveness about 30 seconds. Improved CLAMP and TANGENT SCREW to telescope.
- Compass**—Numbered in quadrants; graduated to half degrees with VARIATION RING. GOLD PLATED NEEDLE $3\frac{1}{2}$ inches long having highest degree of permanent magnetic force, jeweled center and improved lifting arrangement, watertight and removable cover glass.
- Centers**—Of hard bronze anti-friction alloys, long tapered and closely fitted they are stout and unyielding. FOUR LEVELING SCREWS of special composition metal with deep threads. SHIFTING CENTER to set instrument exactly over given point. Improved CLAMP and TANGENT PIECE with connecting bar. (See page 15). Tangent screws with counterspring.
- Center Mark**—On top of telescope for setting transit under point above.
- Finish**—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.
- Tripod**—Split-leg. Base Plate and tripod head having a thread $3\frac{1}{2}$ " in diameter, 8 threads to the inch (U. S. Standard).
- Accessories**—Plumb bob, reading glass, sunshade, adjusting pins, dust brush and screw driver, polished mahogany case with lock, key and strap.
- Weight**—Transit about 16 lbs. Tripod about 11 lbs.
- Gross Weight**—Transit and Tripod packed securely for shipment in two boxes about 65 lbs.

Code Word—BUNTLINE.

Extras for Transit No. 5E.

For which the additional charge is made. Kindly specify if desired.

	Code Word
Horizontal verniers reading to 30 seconds.....	CULLYISM
Horizontal verniers reading to 20 seconds.....	CULMINATE
Vertical circle graduated on the periphery.....	CUPBEARER
Reversion level vial with protection ring.....	CULTURE
Striding level to axis of telescope.....	CULTRATED
Gradiometer attachment to vertical motion with movable head.....	CULPABLE
Opposite double verniers to vertical circle reading to minutes (in lieu of single vernier).....	CURATIVE
Two vernier microscopes.....	CURBING
Full extension tripod in lieu of straight legs.....	CUMBRANCE
Silk protection bag or hood (waterproof).....	CURTAIN

For complete list of features applicable to Lietz Transits see pages 42-45.

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No. 5F

LIETZ 7-INCH TRANSIT THEODOLITE

With 7-inch Horizontal Circle and opposite verniers reading to 10 seconds.
Code Word, **BUNTWELL**

LIETZ TRANSIT THEODOLITE No. 5F

The general design and construction of these instruments is the same as that of our transit No. 5E. These instruments have a 7-inch Horizontal Circle with opposite verniers reading to 10 seconds. With two vernier microscopes on swinging arm.

SPECIFICATIONS

Horizontal Limb—7 inches diameter at edge of graduation. Graduated on heavy ring of **solid silver**, two rows of figures 0° to 360° in opposite directions; figures inclined in the direction verniers should be read; double opposite verniers reading to 10 seconds set at about 30° from the line of collimation, with **ground glass shades**, two vernier microscopes on swinging arm. Two fine **spirit levels** graduated on glass, sensitiveness about 30 seconds.

Vertical Circle—5 inches diameter, graduated on solid silver, double vernier reading to one minute, fitted with removable guard.

Telescope— $11\frac{1}{2}$ inches long, Object glass $1\frac{3}{8}$ in., **INTERNAL FOCUSING**, spiral rack and pinion movement, erecting eyepiece, **MAGNIFYING POWER** 24 diameters. **STADIA HAIRS** fixed, ratio 1:100 reading direct from center of instrument. Spirit level $4\frac{1}{2}$ inches long, graduated on glass, sensitiveness about 30 seconds. Improved **CLAMP** and **TANGENT SCREW** to telescope.

Compass—Numbered in quadrants; graduated to half degrees with **VARIATION RING**. **GOLD PLATED NEEDLE** $3\frac{1}{2}$ inches long having highest degree of permanent magnetic force, jeweled center and improved lifting arrangement, watertight and removable cover glass.

Centers—Of hard bronze anti-friction alloys, long tapered and closely fitted they are stout and unyielding. **FOUR LEVELING SCREWS** of special composition metal with deep threads. **SHIFTING CENTER** to set instrument exactly over given point. Improved **CLAMP** and **TANGENT PIECE** with connecting bar. (See page 15). Tangent screws with counterspring.

Center Mark—On top of telescope for setting transit under point above.

Finish—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.

Tripod—Split-leg. Base Plate and tripod head having a thread $3\frac{1}{2}$ " in diameter, 8 threads to the inch (U. S. Standard).

Accessories—Plumb bob, reading glass, sunshade, adjusting pins, dust brush and screw driver, polished mahogany case with lock, key and strap.

Weight—Transit about 18 lbs. Tripod about 11 lbs.

Gross Weight—Transit and Tripod packed securely for shipment in two boxes about 80 lbs.

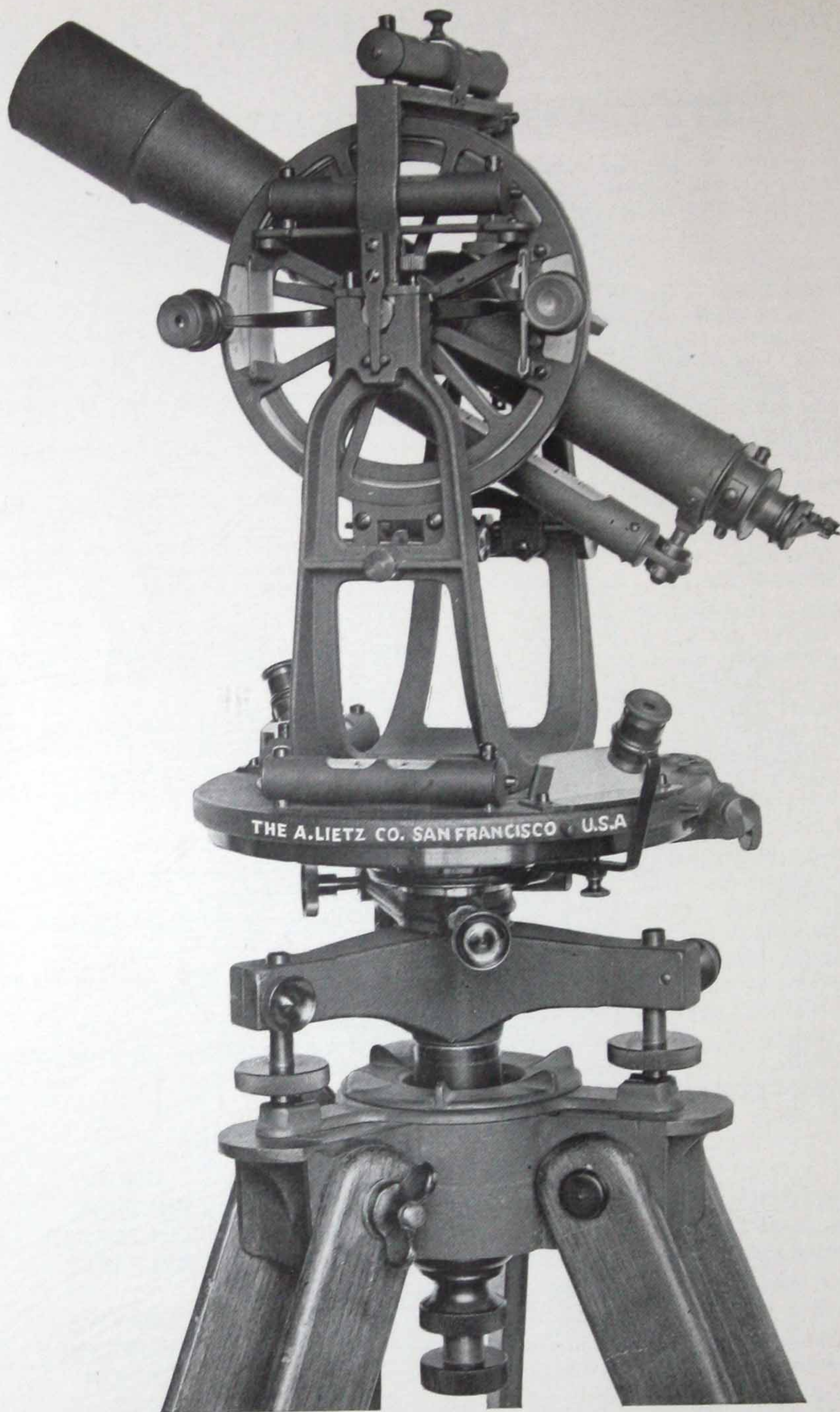
Code Word—**BUNTWELL**.

Extras for Transit No. 5F.

	Code Word
Reversion level vial with protection ring.....	CULTURE
Striding level to axis of telescope.....	CULTRATED
Gradiometer attachment to vertical motion with movable head.....	CULPABLE
Opposite double verniers to vertical circle reading to minutes (in lieu of single vernier).....	CURATIVE
Full extension tripod in lieu of straight legs.....	CUMBRANCE
Silk protection bag or hood (waterproof).....	CURTAIN
Bottle of fine instrument oil.....	CUTEX
Inverting eyepiece (made to order).....	CUTWATER

For complete list of features applicable to Lietz Transits see pages 42-45.

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No. 5G

LIETZ 7-INCH BOUNDARY THEODOLITE

United States Coast and Geodetic Survey Design.
For Triangulation and Boundary Line Surveys.
Code Word, **BURDOCK**

LIETZ 7-INCH BOUNDARY THEODOLITE No. 5G

SPECIFICATIONS

Horizontal Circle—For repeating angles, 7 inches to edge of graduation with two rows of figures 0-360, graduated on solid silver, with opposite verniers reading to 10 seconds of arc. Two vernier microscopes on swinging arm.

Vertical Circle—5 inches to edge of graduation, graduated on solid silver, with two opposite double verniers reading to 30 seconds. Sensitive level attached to vernier arm. Two vernier microscopes.

Telescope—13 inches long, with two interchangeable inverting eyepieces. Magnification 25 and 35 times respectively. Object glass, $1\frac{1}{4}$ -inch diameter, clear aperture, prism to eyepiece with two dark glasses, long sensitive level to telescope. Releasable clamp and tangent screw. Cylindrical telescope axis and wye bearings. Striding Level resting on points of contact. Cross Hairs electrically illuminated through the axis of telescope, with emergency oil lamp.

Center—Made of steel fitted in cast-iron starpiece, with three leveling screws and shifting center.

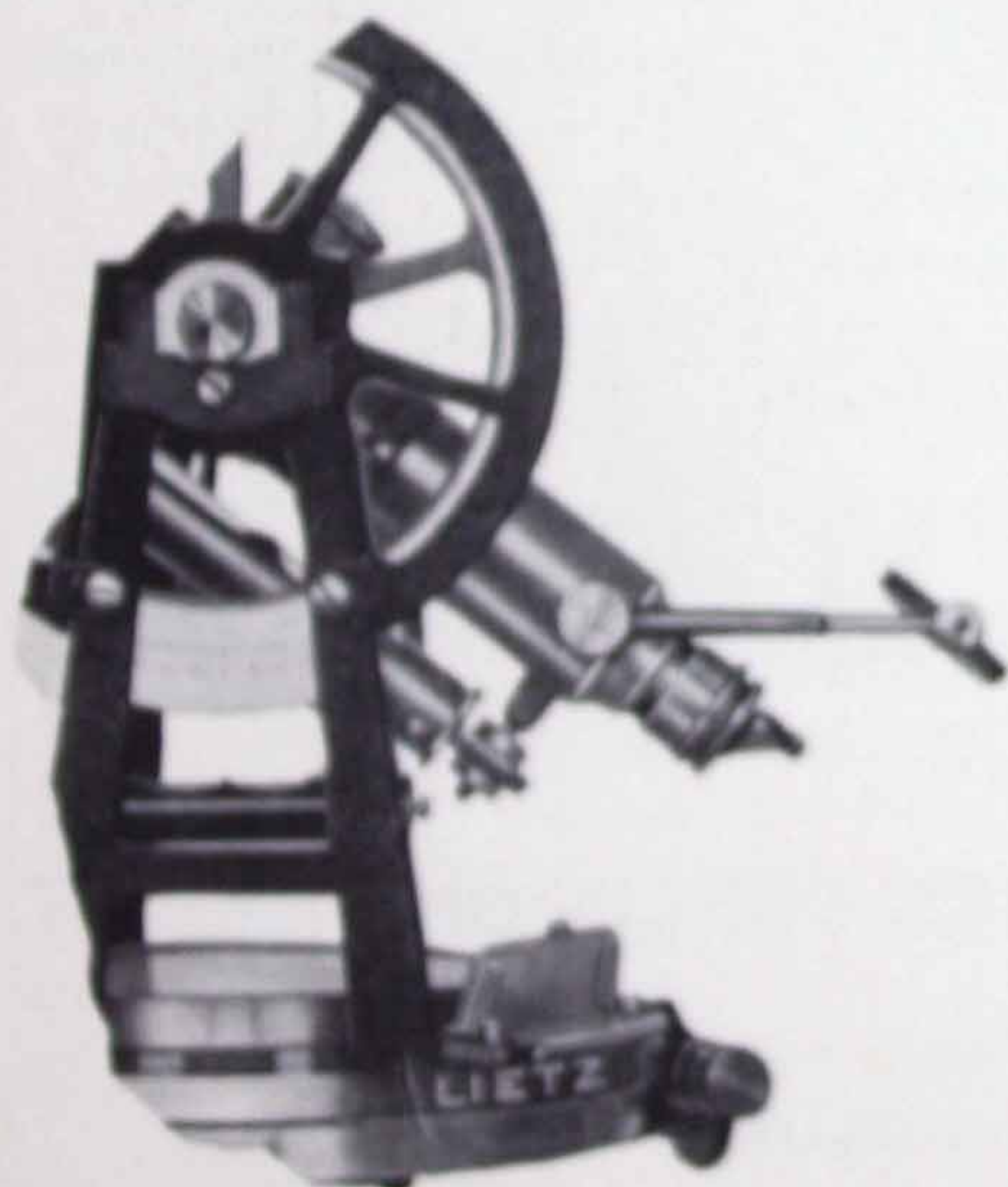
Standard—U-shaped, cast in one piece with wye bearings. Entire instrument constructed so as to give the greatest amount of rigidity and accuracy.

Weight—Instrument, 26 lbs.; tripod, 17 lbs.; two boxes, 26 lbs. For protection and portability the telescope is packed in separate carrying case from the base and standard of the instrument.

Code Word—BURDOCK.

DAVIS SOLAR SCREEN

No. 17D



Davis Solar Screen Attachment for eyepiece of transit.

This permits taking sun observations direct with the instrument telescope. It can be attached to any transit with a vertical circle or vertical arc.

Code Word, CUSTARD

Price includes fitting with new instrument.

Prismatic Eyepiece extra.

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No. 6

LIETZ 5 1/2-INCH ENGINEERS' PRECISION TRANSIT

With Level and Tangent to Telescope

Code Word, **BURLAP**

LIETZ ENGINEERS' TRANSIT No. 6

SPECIFICATIONS

Horizontal Limb—5½ inches diameter at edge of graduation. Graduated on heavy ring of solid silver, two rows of figures 0° to 360° in opposite directions; figures inclined in the direction verniers should be read; double opposite verniers reading to one minute set at about 30° from the line of collimation, with ground glass shades. Two fine spirit levels graduated on glass, sensitiveness about 60 seconds.

Vertical Circle—5 inches diameter, graduated on solid silver, double vernier reading to one minute, fitted with removable guard.

Telescope—10½ inches long. Object glass 1½ in., INTERNAL FOCUSING, spiral rack and pinion movement, erecting eyepiece, MAGNIFYING POWER 20 diameters. STADIA HAIRS fixed, ratio 1:100 reading direct from center of instrument. Spirit level 4½ inches long, graduated on glass, sensitiveness about 30 seconds. Improved CLAMP and TANGENT SCREW to telescope.

Compass—Numbered in quadrants, graduated to half degrees with VARIATION RING. GOLD PLATED NEEDLE 4½ inches long having highest degree of permanent magnetic force, jeweled center and improved lifting arrangement, watertight and removable cover glass.

Centers—Of hard bronze anti-friction alloys, long tapered and closely fitted they are stout and unyielding. FOUR LEVELING SCREWS of special composition metal with deep threads. SHIFTING CENTER to set instrument exactly over given point. Improved CLAMP and TANGENT PIECE with connecting bar. (See page 15). Tangent screws with counterspring.

Center Mark—On top of telescope for setting transit under point above.

Finish—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.

Tripod—Split-log. Base Plate and tripod head having a thread 3½" in diameter, 4 threads to the inch (U. S. Standard).

Accessories—Plumb bob, reading glass, sunshade, adjusting pins, dust brush and screw driver, polished mahogany case with lock, key and strap.

Weight—Transit about 13 lbs. Tripod about 11 lbs.

Gross Weight—Transit and Tripod packed securely for shipment in two boxes about 65 lbs.

Code Word—BURLAP.

Extras for Transit No. 6.

	Code Word
Reversion level vial with protection ring	CULTURE
Arrangement for offsetting right angles	CULTIVATE
Graduator attachment to vertical motion with movable head	CULPABLE
Prism to eyepiece with neutral glass	CUMBERSOME
Colored object glass cap in lieu of ordinary	CUTLERY
Full extension tripod in lieu of straight legs	CUMBRANCE
Constructed with three leveling screws instead of four	CULVERIN
Three leveling screw shifting center	CUMBER
Silk protection bag or hood (waterproof)	CURTAIN
Bottle of fine instrument oil	CUTEX
Inverting eyepiece (made to order only)	CUTWATER

For complete list of features applicable to Lietz Transits see pages 42-45

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No. 8

LIETZ 5-INCH ENGINEERS' PRECISION TRANSIT

With 4-inch Vertical Arc and double vernier reading to minutes.

Code Word, **BULGED**

LIETZ ENGINEERS' TRANSIT No. 8

SPECIFICATIONS

Horizontal Limb—5 inches diameter at edge of graduation. Graduated on heavy ring of **solid silver**, two rows of figures 0° to 360° in opposite directions; figures inclined in the direction verniers should be read; double opposite verniers reading to one minute set at about 30° from the line of collimation, with **ground glass shades**. Two fine **spirit levels** graduated on glass, sensitiveness about 60 seconds.

Vertical Arc—4 inches diameter, graduated on solid silver, double vernier reading to one minute, fitted with removable guard.

Telescope— $8\frac{1}{2}$ inches long, Object glass $1\frac{1}{8}$ in., INTERNAL FOCUSING, spiral rack and pinion movement, erecting eyepiece, MAGNIFYING POWER 18 diameters. STADIA HAIRS fixed, ratio 1:100 reading direct from center of instrument. Spirit level $4\frac{3}{8}$ inches long, graduated on glass, sensitiveness about 30 seconds. Improved CLAMP and TANGENT SCREW to telescope.

Compass—Numbered in quadrants; graduated to half degrees with VARIATION RING. GOLD PLATED NEEDLE $3\frac{1}{2}$ inches long having highest degree of permanent magnetic force, jeweled center and improved lifting arrangement, watertight and removable cover glass.

Centers—Of hard bronze anti-friction alloys, long tapered and closely fitted they are stout and unyielding. FOUR LEVELING SCREWS of special composition metal with deep threads. SHIFTING CENTER to set instrument exactly over given point. Improved CLAMP and TANGENT PIECE with connecting bar. (See page 15). Tangent screws with counterspring.

Center Mark—On top of telescope for setting transit under point above.

Finish—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.

Tripod—Extension type. Base Plate and tripod head having a thread $3\frac{1}{2}$ " in diameter, 8 threads to the inch (U. S. Standard).

Accessories—Plumb bob, reading glass, sunshade, adjusting pins, dust brush and screw driver, polished mahogany case with lock, key and strap.

Weight—Transit about 11 lbs. Tripod about 13 lbs.

Gross Weight—Transit and Tripod packed securely for shipment in two boxes about 65 lbs.

Code Word—**BULGED**.

Extras for Transit No. 8

	Code Word
Reversion level vial with protection ring.....	CULTURE
Arrangement for offsetting right angles.....	CULTIVATE
Gradiometer attachment to vertical motion with movable head....	CULPABLE
Prism to eyepiece, with neutral glass.....	CUMBERSOME
Colored object glass cap in lieu of ordinary.....	CUTLERY
Constructed with three leveling screws instead of four.....	CULVERIN
Three leveling screw shifting center.....	CUMBER
Silk protection bag or hood (waterproof).....	CURTAIN
Bottle of fine instrument oil.....	CUTEX
Inverting eyepiece (made to order only).....	CUTWATER

For complete list of features applicable to Lietz Transits see pages 42-45.

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No. 9

LIETZ 5-INCH ENGINEERS' PRECISION TRANSIT

With 4-inch full Vertical Circle and double vernier reading to minutes.

Code Word, **BULIMY**

LIETZ ENGINEERS' TRANSIT No. 9

SPECIFICATIONS

Horizontal Limb—5 inches diameter at edge of graduation. Graduated on heavy ring of **solid silver**, two rows of figures 0° to 360° in opposite directions; figures inclined in the direction verniers should be read; double opposite verniers reading to one minute set at about 30° from the line of collimation, with **ground glass shades**. Two fine **spirit levels** graduated on glass, sensitiveness about 60 seconds.

Vertical Circle—4 inches diameter, graduated on solid silver, double vernier reading to one minute, fitted with removable guard.

Telescope— $8\frac{1}{2}$ inches long, Object glass $1\frac{1}{8}$ in., **INTERNAL FOCUSING**, spiral rack and pinion movement, erecting eyepiece, **MAGNIFYING POWER 18** diameters. **STADIA HAIRS** fixed, ratio 1:100 reading direct from center of instrument. Spirit level $3\frac{1}{2}$ inches long, graduated on glass, sensitiveness about 30 seconds. Improved **CLAMP** and **TANGENT SCREW** to telescope.

Compass—Numbered in quadrants; graduated to half degrees with **VARIATION RING**. **GOLD PLATED NEEDLE** $3\frac{1}{2}$ inches long having highest degree of permanent magnetic force, jeweled center and improved lifting arrangement, watertight and removable cover glass.

Centers—Of hard bronze anti-friction alloys, long tapered and closely fitted they are stout and unyielding. **FOUR LEVELING SCREWS** of special composition metal with deep threads. **SHIFTING CENTER** to set instrument exactly over given point. Improved **CLAMP** and **TANGENT PIECE** with connecting bar. Tangent screws with counterspring.

Center Mark—On top of telescope for setting transit under point above.

Finish—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.

Tripod—Extension Type. Base Plate and tripod head having a thread $3\frac{1}{2}$ " in diameter, 8 threads to the inch (U. S. Standard).

Accessories—Plumb bob, reading glass, sunshade, adjusting pins, dust brush and screw driver, polished mahogany case with lock, key and strap.

Weight—Transit about 11 lbs. Tripod about 13 lbs.

Gross Weight—Transit and Tripod packed securely for shipment in two boxes about 65 lbs.

Code Word—**BULIMY**.

Extras for Transit No. 9

	Code Word
Reversion level vial with protection ring.....	CULTURE
Arrangement for offsetting right angles.....	CULTIVATE
Gradiometer attachment to vertical motion with movable head....	CULPABLE
Prism to eyepiece with neutral glass.....	CUMBERSOME
Colored object glass cap in lieu of ordinary.....	CUTLERY
Constructed with three leveling screws instead of four.....	CULVERIN
Three leveling screw shifting center.....	CUMBER
Silk protection bag or hood (waterproof).....	CURTAIN
Bottle of fine instrument oil.....	CUTEX
Inverting eyepiece (made to order only).....	CUTWATER

For complete list of features applicable to Lietz Transits see pages 42-45.

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No. 11E

LIETZ TRANSIT THEODOLITE

With 5-inch Horizontal Circle and 4-inch full Vertical Circle.

Code Word, **BULLFINCH**

LIETZ ENGINEERS' TRANSIT No. 11E

WITH "U" SHAPED STANDARDS

This is the same type of instrument as our Nos. 5E and 5F but of a smaller and more portable size. A compact and accurate instrument incorporating the characteristics of construction and stability as obtained in the larger instruments.

SPECIFICATIONS

Horizontal Limb—5 inches diameter at edge of graduation. Graduated on heavy ring of solid silver, two rows of figures 0° to 360° in opposite directions; figures inclined in the direction verniers should be read; double opposite verniers reading to one minute set at about 30° from the line of collimation, with ground glass shades. Two fine spirit levels graduated on glass, sensitiveness about 60 seconds.

Vertical Circle—4 inches diameter, graduated on solid silver, double vernier reading to one minute, fitted with removable guard.

Telescope—8½ inches long, Object glass 1½ in., INTERNAL FOCUSING, spiral rack and pinion movement, erecting eyepiece, MAGNIFYING POWER 18 diameters. STADIA HAIRS fixed, ratio 1:100 reading direct from center of instrument. Spirit level 3½ inches long, graduated on glass, sensitiveness about 30 seconds. Improved CLAMP and TANGENT SCREW to telescope.

Compass—Numbered in quadrants; graduated to half degrees with VARIATION RING. GOLD PLATED NEEDLE 2½ inches long having highest degree of permanent magnetic force, jeweled center and improved lifting arrangement, watertight and removable cover glass.

Centers—Of hard bronze anti-friction alloys, long tapered and closely fitted they are stout and unyielding. FOUR LEVELING SCREWS of special composition metal with deep threads. SHIFTING CENTER to set instrument exactly over given point. Improved CLAMP and TANGENT PIECE with connecting bar. Tangent screws with counterspring.

Center Mark—On top of telescope for setting transit under point above.

Finish—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.

Tripod—Extension Type. Base Plate and tripod head having a thread 3½" in diameter, 8 threads to the inch (U. S. Standard).

Accessories—Plumb bob, reading glass, sunshade, adjusting pins, dust brush and screw driver, polished mahogany case with lock, key and strap.

Weight—Transit about 11 lbs. Tripod about 13 lbs.

Gross Weight—Transit and Tripod packed securely for shipment in two boxes about 65 lbs.

Code Word—BULLFINCH.

Extras for Transit No. 11E

	Code Word
Horizontal verniers reading to 30 seconds.....	CULLYISM
Two vernier microscopes.....	CURBING
Reversion level vial with protection ring.....	CULTURE
Striding level to axis of telescope.....	CULTRATED
Gradienter attachment to vertical motion with movable head.....	CULPABLE
Prism to eyepiece with neutral glass.....	CUMBERSOME
Silk protection bag or hood (waterproof).....	CURTAIN
Bottle of fine instrument oil.....	CUTEX
Inverting eyepiece (made to order only).....	CUTWATER

For complete list of features applicable to Lietz Transits see pages 42-43.

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No. 12

**LIETZ 4-INCH MOUNTAIN AND
RECONNAISSANCE TRANSIT**

Code Word, **BULLCalf**

LIETZ MOUNTAIN AND MINING TRANSIT No. 12

These instruments have been constructed and are recommended where great portability and lightness are desired. They are in every respect equal to and have all the features of our larger transits. In addition to their portability, this type permits of measuring greater vertical angles, which is often necessary in Mountain and Mining work where the engineer is confronted with steep vertical angular requirements. These instruments are also prepared to receive the side or top telescope for extreme or prime verticals. On account of their accuracy and stability, these instruments can be used for any kind of engineering work.

SPECIFICATIONS

Horizontal Limb—4 inches diameter at edge of graduation. Graduated on heavy ring of solid silver, two rows of figures 0° to 360° in opposite directions; figures inclined in the direction verniers should be read; double opposite verniers reading to one minute set at about 30° from the line of collimation, with ground glass shades. Two fine spirit levels graduated on glass, sensitiveness about 60 seconds.

Vertical Circle—4 inches diameter, graduated on solid silver, double vernier reading to one minute, fitted with removable guard.

Telescope—8½ inches long. Object glass 1½ in., INTERNAL FOCUSING, spiral rack and pinion movement, erecting eyepiece, MAGNIFYING POWER 18 diameters, STADIA HAIRS fixed, ratio 1:100 reading direct from center of instrument. Spirit level 3½ inches long, graduated on glass, sensitiveness about 30 seconds. Improved CLAMP and TANGENT SCREW to telescope.

Compass—Numbered in quadrants; graduated to half degrees with VARIATION RING. GOLD PLATED NEEDLE 2½ inches long having highest degree of permanent magnetic force, jeweled center and improved lifting arrangement, watertight and removable cover glass.

Centers—Of hard bronze anti-friction alloys, long tapered and closely fitted they are stout and unyielding. FOUR LEVELING SCREWS of special composition metal with deep threads. SHIFTING CENTER to set instrument exactly over given point. Improved CLAMP and TANGENT PIECE with connecting bar. (See page 15). Tangent screws with counterspring.

Center Mark—On top of telescope for setting transit under point above.

Finish—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.

Tripod—Extension Type. Base Plate and tripod head having a thread 3½" in diameter, 8 threads to the inch (U. S. Standard).

Accessories—Plumb bob, reading glass, sunshade, adjusting pins, dust brush and screw driver, polished mahogany case with lock, key and strap.

Weight—Transit about 9 lbs. Tripod about 13 lbs.

Gross Weight—Transit and Tripod packed securely for shipment in two boxes about 60 lbs.

Code Word—BULLCALK.

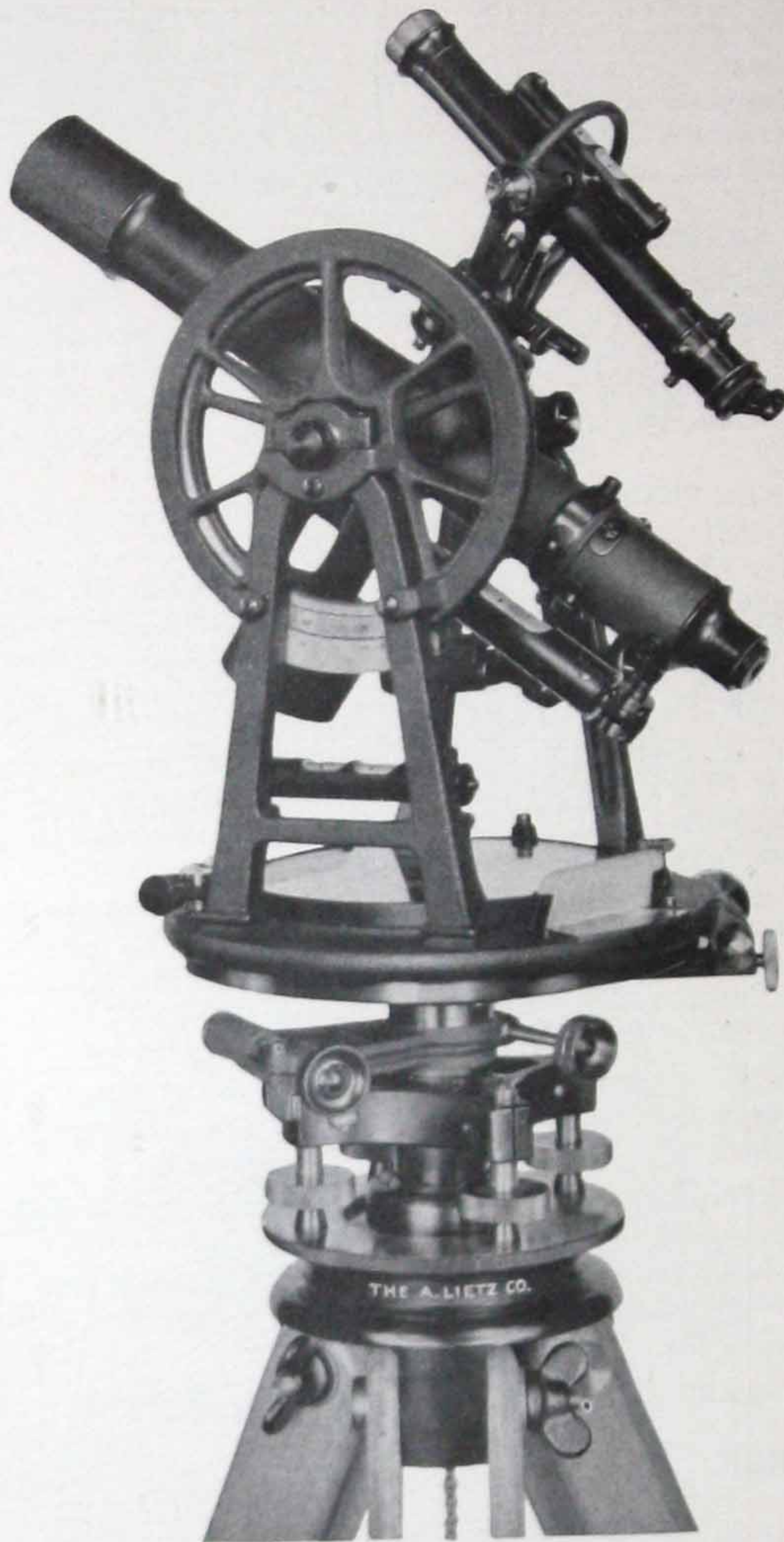
Extras for Transit No. 12

	Code Word
Reversion level and protection ring.....	CULTURE
Prism to eyepiece with neutral glass.....	CUMBERSOME
Constructed with three leveling screws instead of four.....	CULVERIN
Three leveling screw shifting center.....	CUMBER
Gradienter attachment with movable head.....	CULPABLE
Silk protection bag or hood (waterproof).....	CURTAIN
Bottle of fine instrument oil.....	CUTEX
Inverting eyepiece (made to order only).....	CUTWATER

For complete list of features applicable to Lietz Transits see pages 42-45.

SEE PRICE LIST IN BACK OF CATALOG

SAEGMUELLER SOLAR ATTACHMENT



Illustrating Lietz Transit fitted with
Saegmueller Solar Attachment.

- No. 16. Lietz Saegmueller Solar Attachment..... Code Word **CUMBROUS**
Price includes fitting with new instrument.
Nominal charge made when fitted to used transit.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ INTERCHANGEABLE TOP AND SIDE TELESCOPE



Showing Secondary Telescope in position on the side for measuring vertical angles.



Showing Secondary Telescope in position on top for measuring horizontal angles.

No. 17. Secondary Telescope, $6\frac{3}{4}$ inches long, erecting eyepiece, Magnifying Power 14 diameters, complete with counterpoise.

Code Word

CUNEATED

Lietz Secondary Telescope is detachable and interchangeable. It may be attached to the top or the side of the instrument as conditions require.

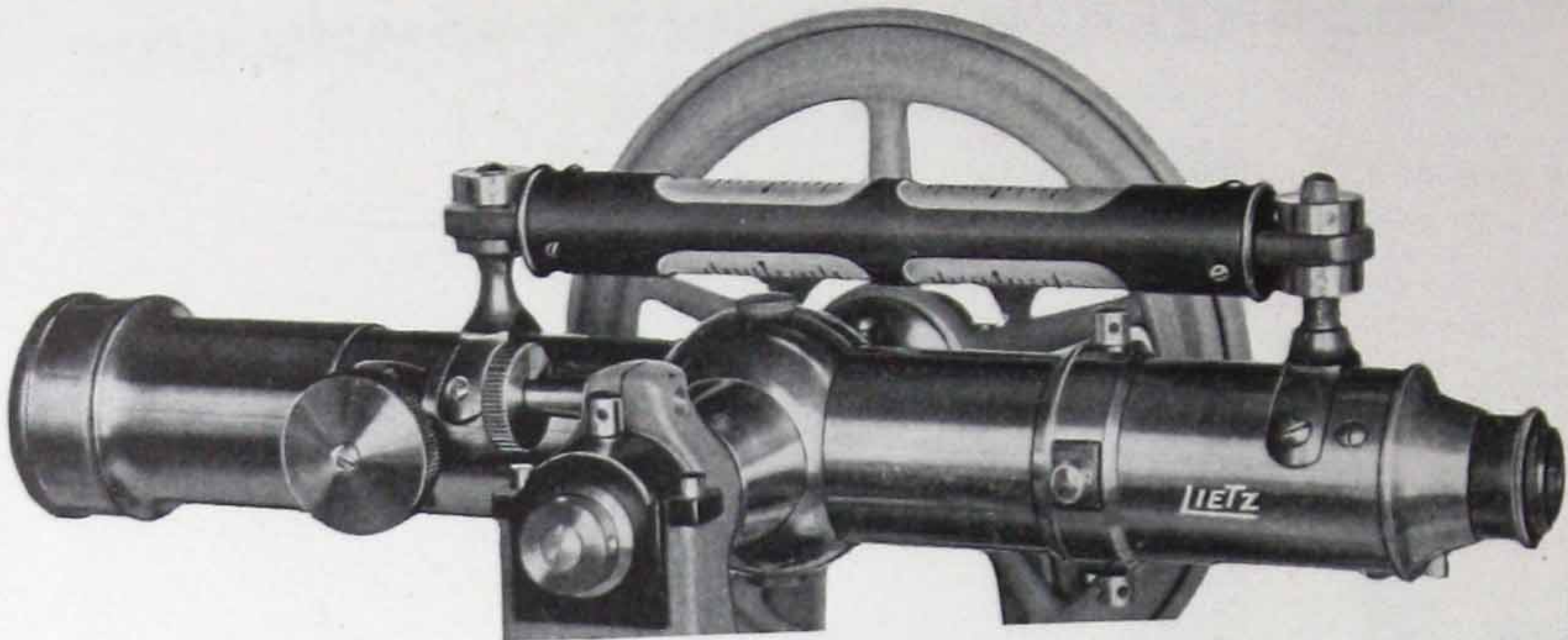
Price includes fitting with new instrument.

SEE PRICE LIST IN BACK OF CATALOG

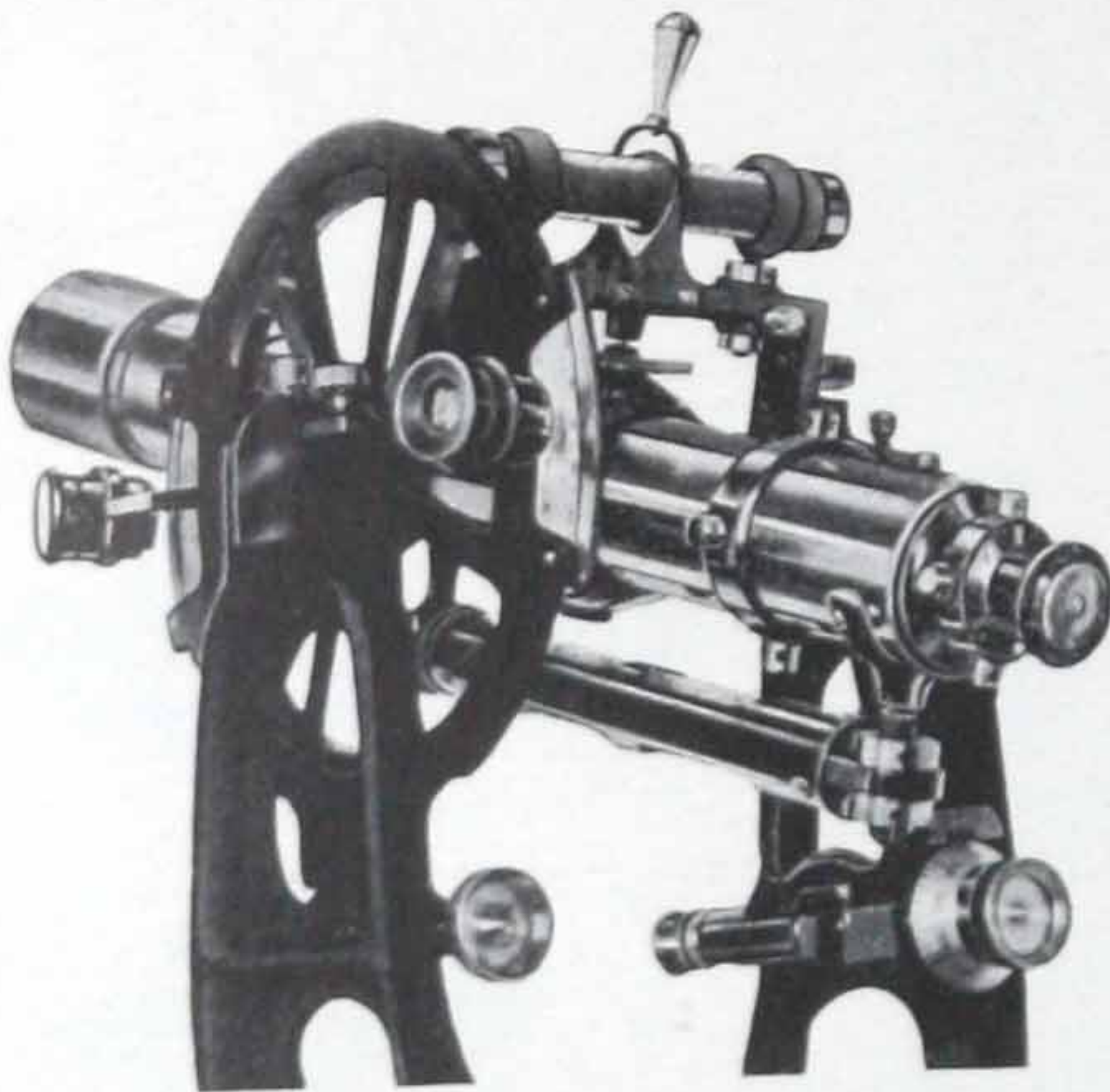
THE A. LIETZ COMPANY

MODERN ENGINEERS' AND
SURVEYORS' INSTRUMENTS

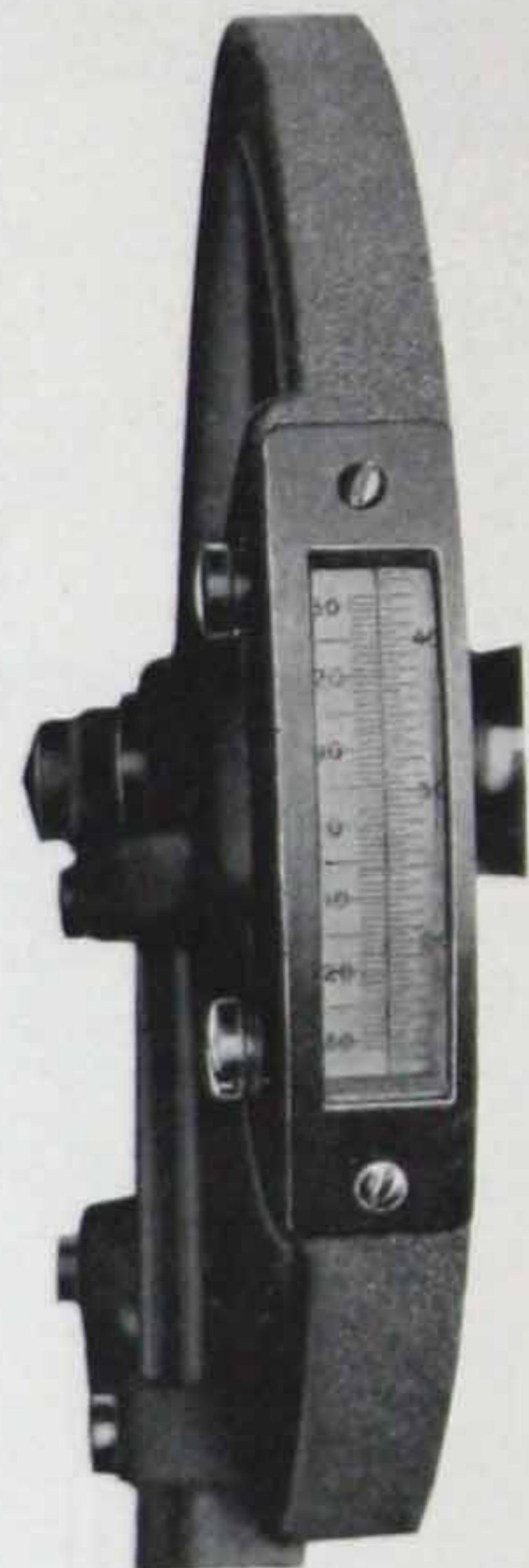
SAN FRANCISCO, U. S. A.



REVERSION LEVEL
For leveling with telescope on back sight. Applicable
to any of our transits.
Code Word, **CULTURE**



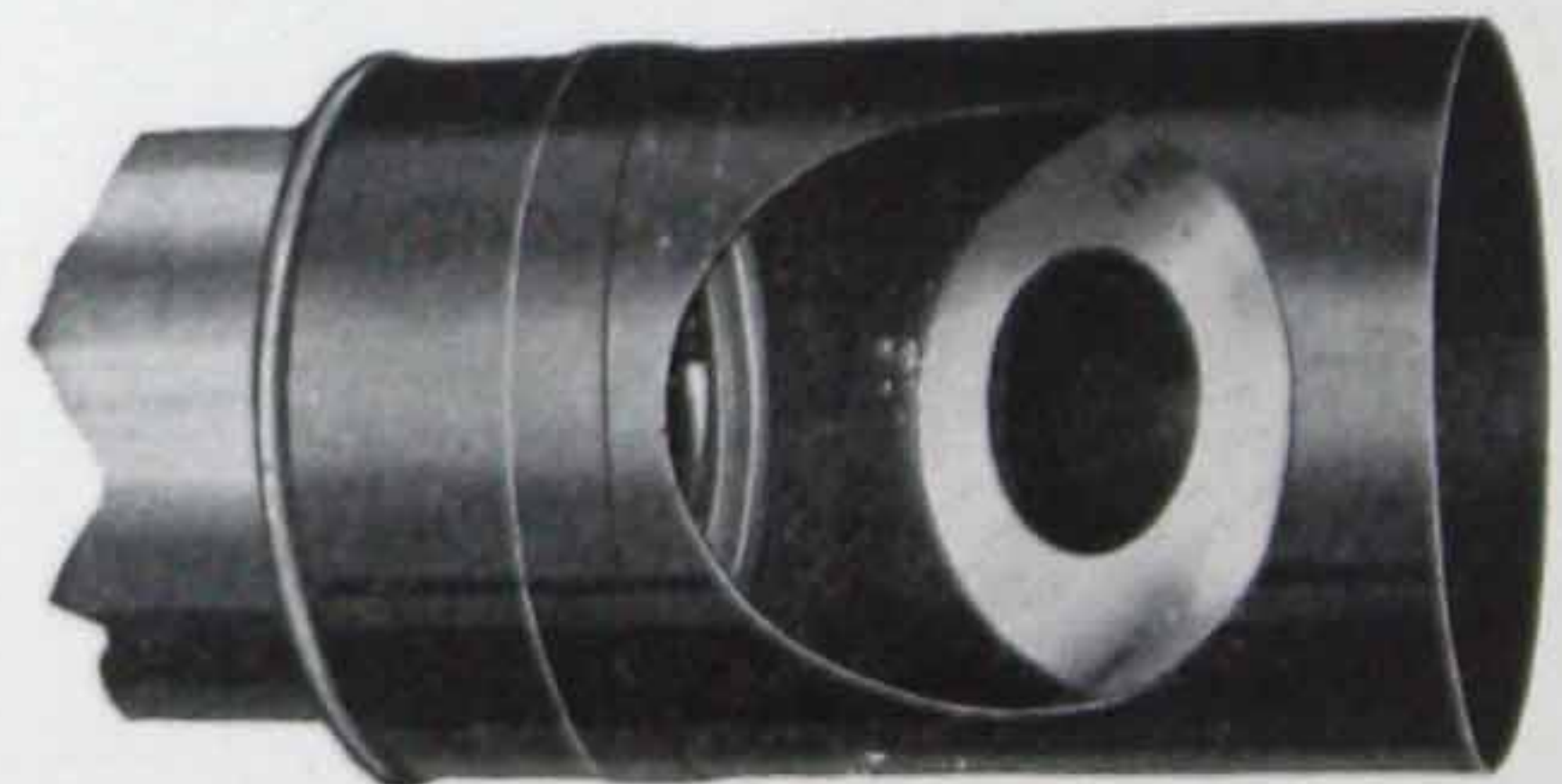
DOUBLE OPPOSITE VERNIER ATTACHMENT
Code Word, **CURATIVE**
Two Vernier Microscopes. Code Word, **CURBING**



VERTICAL CIRCLE
GRADUATED ON
PERIPHERY
Code Word, **CUPBEARER**



ATTACHABLE PRISM
TO EYEPIECE
Code Word, **CUMBERSOME**



REFLECTOR SHADE FOR ILLUMINATING
CROSS HAIRS
Code Word, **CUNEIFORM**

Gradiometer, see page 15.

SEE PRICE LIST IN BACK OF CATALOG

COMPLETE LIST OF FEATURES APPLICABLE TO LIETZ INSTRUMENTS

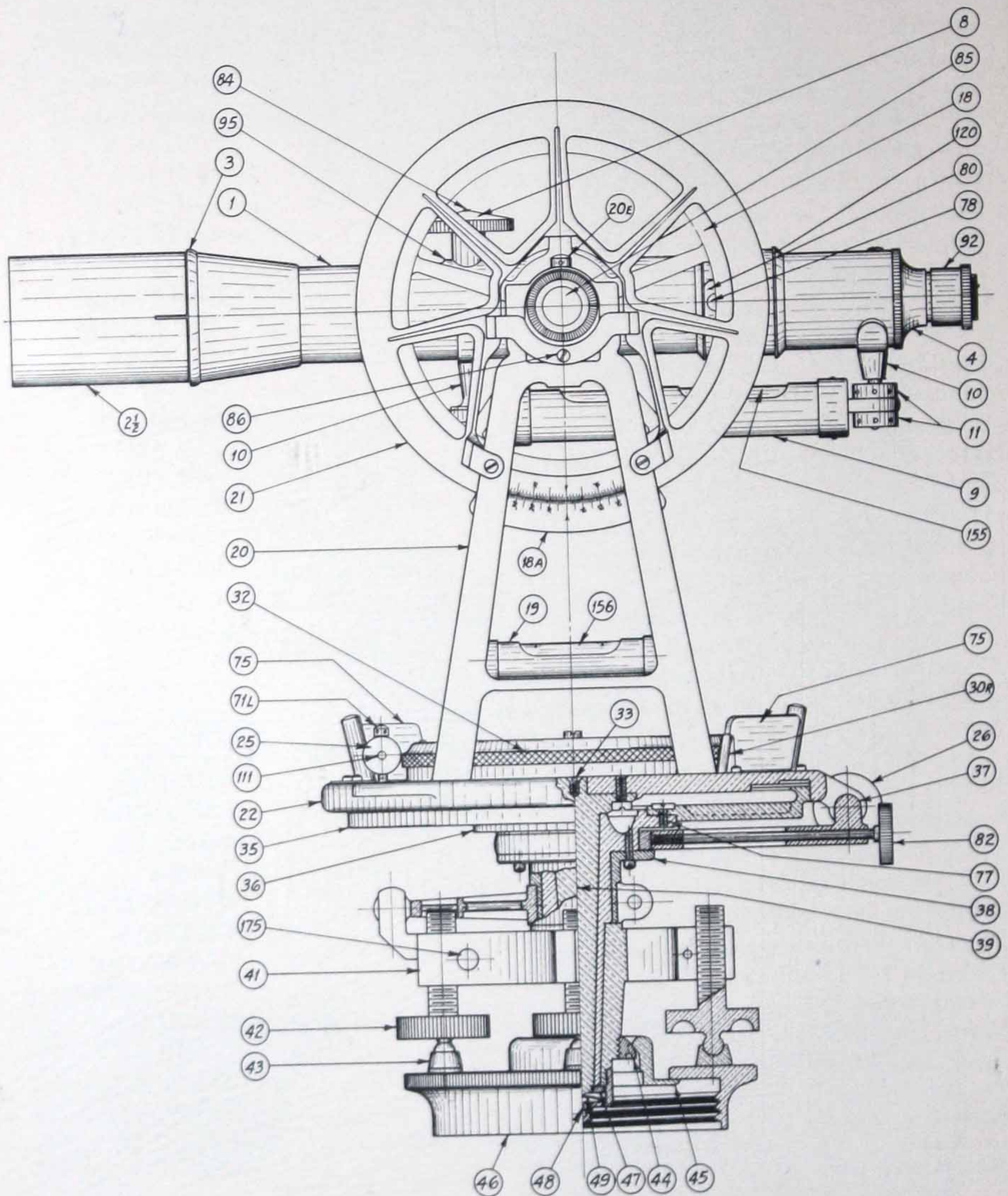
For which additional charge is made when not included in the specifications and prices as quoted in price lists. Please specify if desired.

	Code Word
Horizontal verniers reading to 30 seconds.....	CULLYISM
Horizontal verniers reading to 20 seconds.....	CULMINATE
Horizontal verniers reading to 10 seconds.....	CURABLE
Stadia hairs fixed.....	CUPOLA
Disappearing stadia hairs.....	CUPRIC
Variation ring to compass.....	CULPRIT
Arrangement for offsetting right angles.....	CULTIVATE
Gradiometer attachment to vertical motion with movable head (see page 15).....	CULPABLE
Constructed with three leveling screws instead of four.....	CULVERIN
Three leveling screws shifting center.....	CUMBER
Striding level to axis of telescope.....	CULTRATED
Beaman Stadia Arc for Alidade.....	DIAMOND
Stadia Circle for Transit.....	CULTAG
Reversion level with protective housing in lieu of ordinary.....	CULTURE
Level for vernier arm for control of zero on vernier.....	DIAGNOSE
Prism to eyepiece with neutral glasses.....	CUMBERSOME
Colored glass object cap.....	CUTLERY
Colored glass eyepiece cap.....	CUTLET
Colored glass in shutter of cap.....	CUTAWAY
Elbow zenith eyepiece.....	CUTLASS
Guard to vertical circle.....	CUMSHAW
Vertical circle graduated on the periphery with guard.....	CUPBEARER
Vertical circle with two opposite verniers in lieu of single.....	CURATIVE
Two vernier microscopes.....	CURBING
Mining bracket for mounting transits in mines.....	CUTWORM
Lateral adjuster for transits with four leveling screws.....	CUPLING
One extension leg in lieu of one split leg.....	CURLY
Full extension tripod instead of straight legs.....	CUMBRANCE
Protection bag, silk, waterproof.....	CURTAIN
Inverting eyepiece (made to order only).....	CUTWATER
Reflector for illuminating cross hairs.....	CUNEIFORM
Compass needle in box on plate, 4½" long.....	CURBLES
Mirror to control bubble from the end.....	CUPID
Agate-fitted wyes.....	CUPIDITY
Trough compass for alidade.....	DROUGHT
Leather cover for transit box with shoulder straps.....	CYCLOID

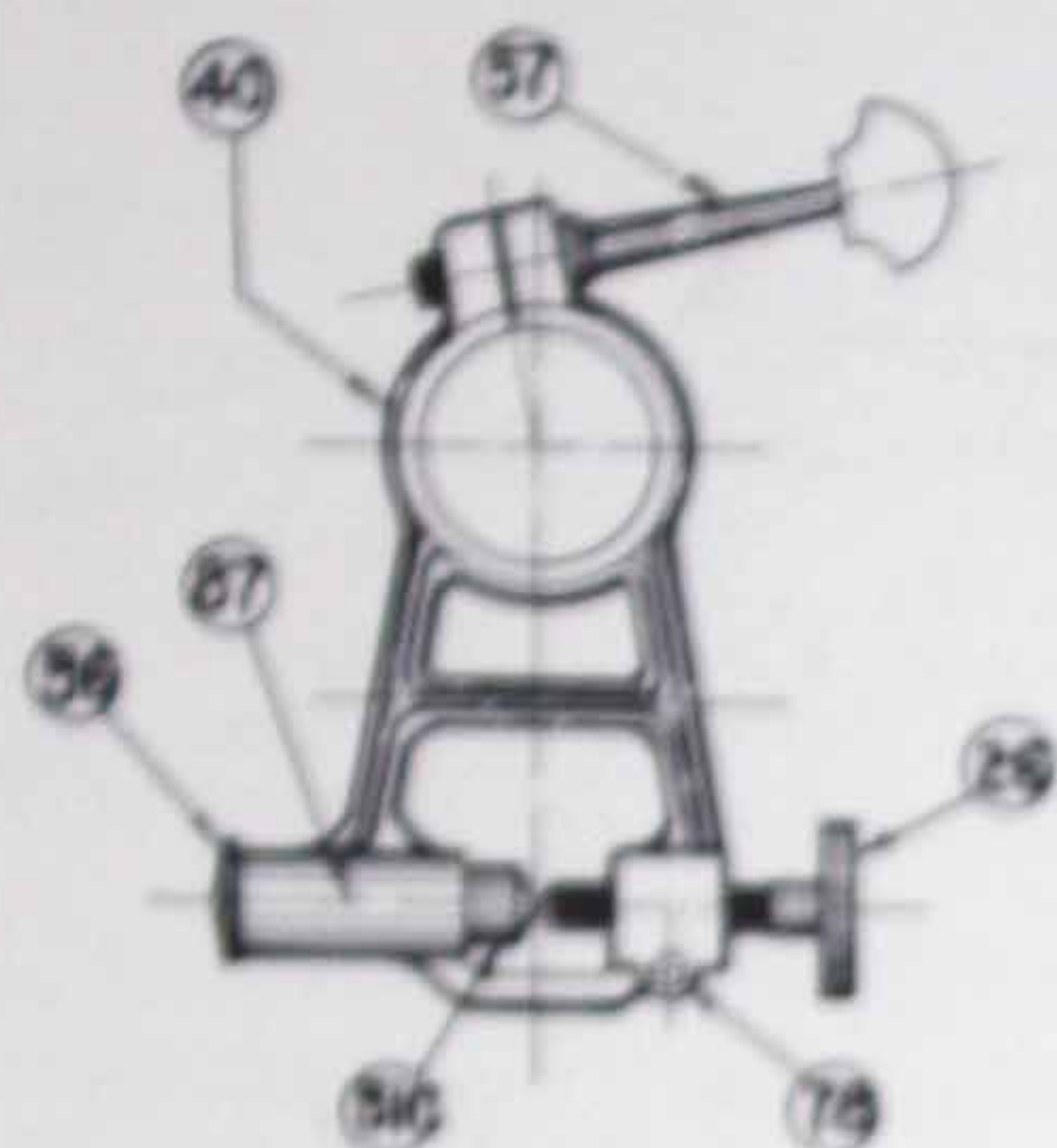
Note: Solar attachments and secondary telescopes, see pages 42 and 43.

SEE PRICE LIST IN BACK OF CATALOG

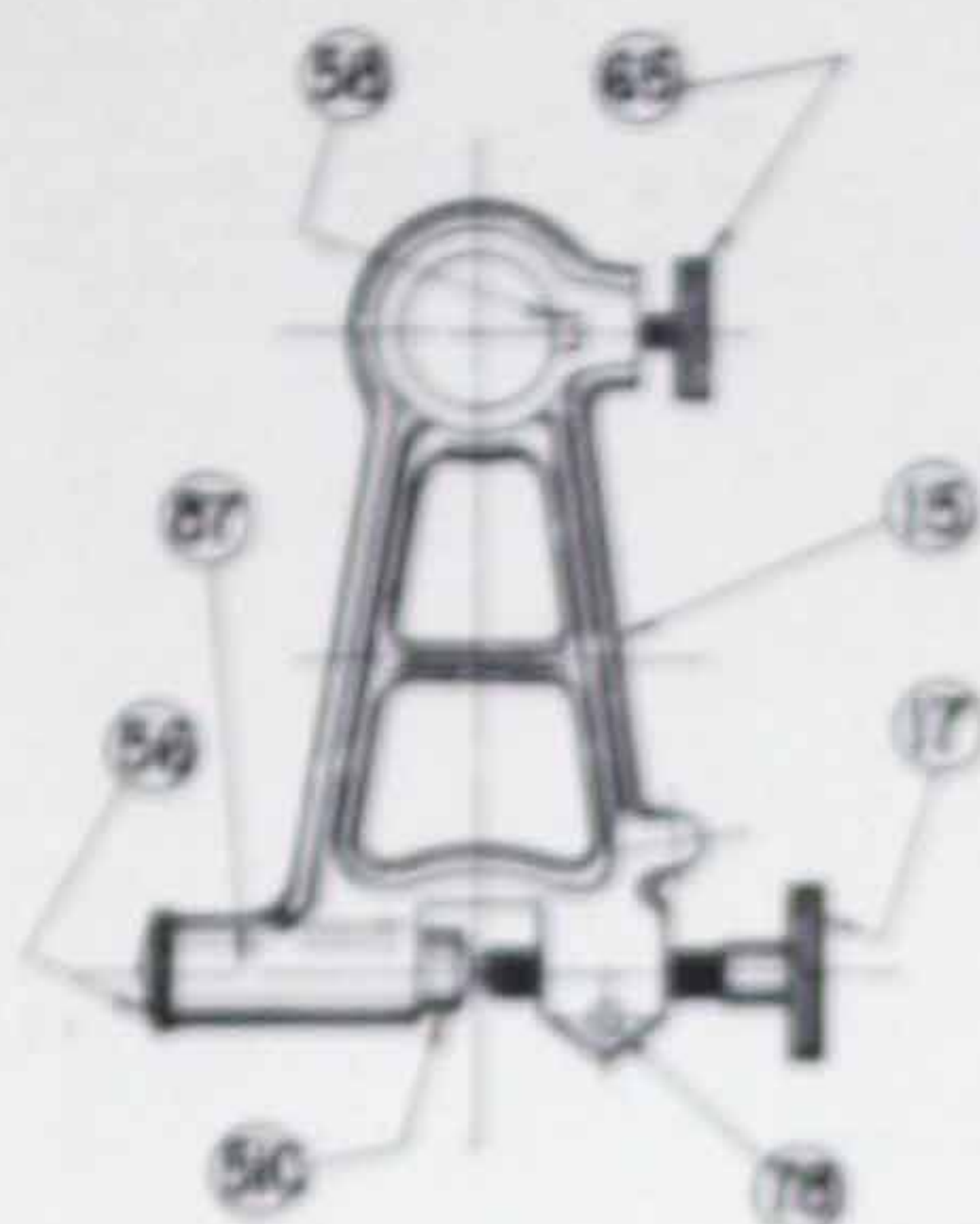
CROSS SECTION OF LIETZ TRANSIT



PARTS SUSCEPTIBLE TO LOSS OR INJURY



Piece 40, Lower Clamp
complete



Piece 15, Axis Clamp
complete

Please order part by piece number, giving serial number of instrument. It must be borne in mind that vital parts of Precision Instruments cannot be made interchangeable. It is therefore advisable to forward broken parts.

Pieces
No.

- 24. Sunshade.
- 8. Cross Hair Frame.
- 8. Pinion Head.
- 15. Axis Clamp complete.
- 17. Tangent Screw.
- 18. Vertical Circle.
- 19. Standard Level Case.
- 21. Vertical Circle Guard.
- 25. Plate Level Case.
- 26. Plate Tangent Screw.
- 30. Vernier Shade Bracket.
- 32. Compass Glass Bezel.
- 34. Compass Needle.
- 37. Plate Clamp complete.
- 38. Collar.
- 40. Lower Clamp complete.
- 42. Leveling Screws.
- 43. Leveling Screw Cups.
- 46. Base Plate.

Pieces
No.

- 47. Spindle Nut.
- 48. Plumb bob Cap.
- 49. Spindle Release Spring.
- 50. Compass Glass.
- 51A. Plunger for Plate Tangent.
- 51G. Plunger for Clamps.
- 58. Cap for Clamps.
- 57. Clamp Screw.
- 42. Standard Cap Screw.
- 65. Axis Clamp Screw.
- 75. Shade Glasses.
- 82. Plate Clamp Screw.
- 85. Axon for Axis.
- 88. Guard Screws.
- 47. Tangent Spring.
- 88. Chain for Plumb bob.
- 89. Vernier Cover Glasses.
- 90. Dust Cap for Telescope.
- 95. Coilet.

NEW DIAPHRAGMS WITH CROSS AND STADIA HAIRS

(Furnished complete with Cross Hair Frame Screws)

New Diaphragm with Cross Hairs only (design No. 1).....	Cyclic
New Diaphragm with Cross and Stadia Hairs (design No. 2)....	Cyclom
New Diaphragm with Hairs, Special Design.....	Cyclone

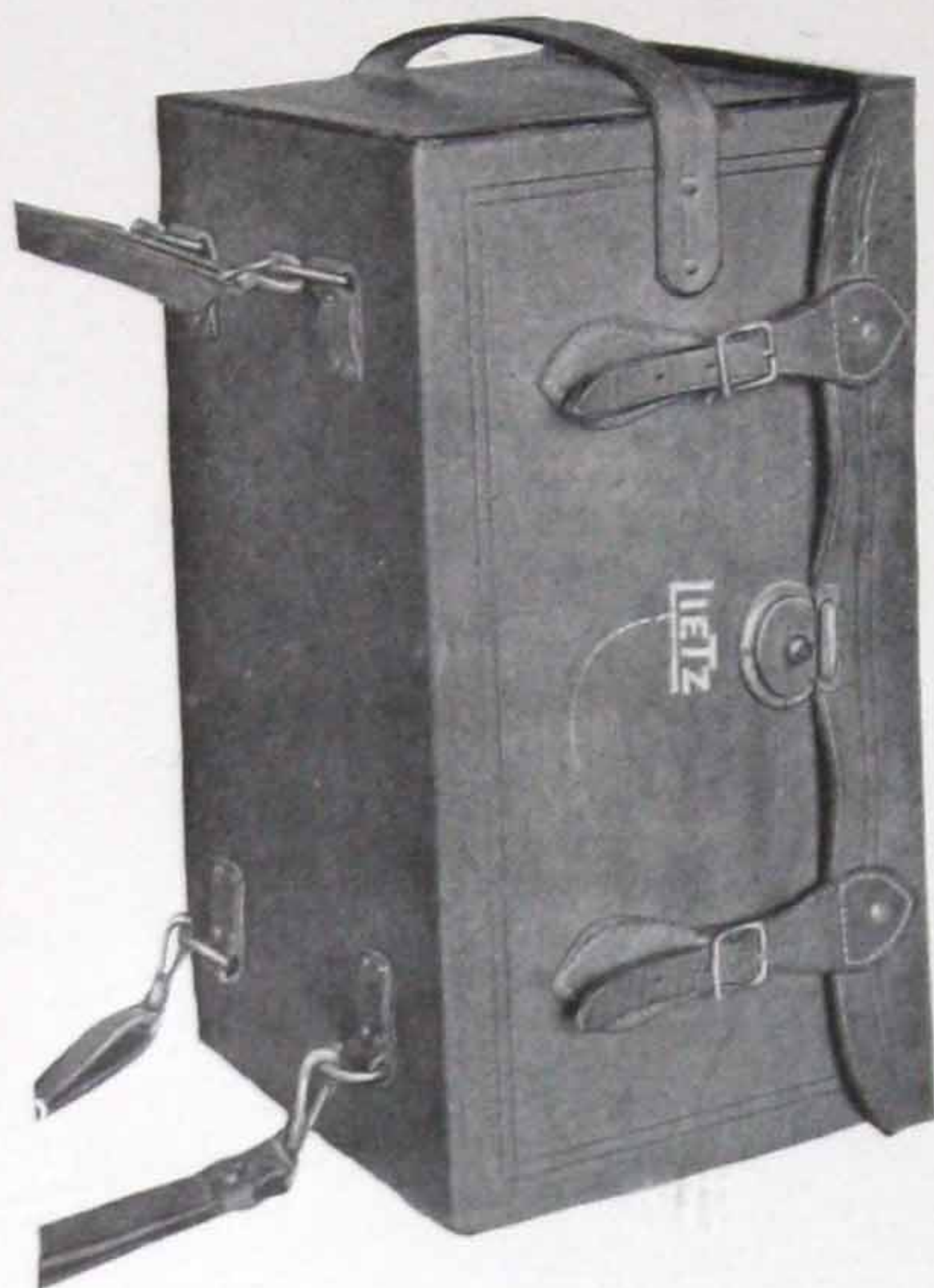
When ordering Diaphragm with Special Cross Hairs please refer to page 17 and state DESIGN NUMBER required.

For Level Vials and Housing see page 59.

SEE PRICE LIST IN BACK OF CATALOG

INSTRUMENT BOXES AND ACCESSORIES

Code Word



Leather Carrying Cases
Code Word, **CYCLOID**

New mahogany box with wooden fittings and strap complete for Transits Type 4 and 9.....**CYME**

New mahogany box with wooden fittings and strap complete for Levels Type 19 and 20T.....**CYMER**

New mahogany box with wooden fittings and strap complete for Transits Type 12.....**CYPRESS**

Extra key for boxes.....

New strap for boxes.....

New bumpers for boxes.....

New shipping boxes with carrying rope for transits and levels.....

Leather Cover for Transit box with shoulder straps.....**CYCLOID**

When a new mahogany box is required, the instrument should be sent to us for proper fitting. Also when a leather cover is wanted for an old instrument box, it is necessary that we have the box for proper fitting.

SUNDRIES FOR TRANSITS AND LEVELS



25A



B



C



D



E

- | | | |
|---------|---|----------------|
| No. 25A | Lietz Surveying Instrument Oil—will not gum or freeze. | CUTEX |
| No. 25B | Tempered Steel Adjusting Pins for Instrument Adjustments. | CYPRIAN |
| No. 25C | Tempered Steel Adjusting Pins, Large Size for Y Levels. | CYSTON |
| No. 25D | Camel Hair Dust Brush for Instruments. | CYTUM |
| No. 25E | Spanner Wrench. | CYTAX |
| No. 25F | Instrument Screw Driver. | CYTELL |
| No. 25G | Silk Protection Bag* (Waterproof). | CURTAIN |

*Advise whether for Transit or Level.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ ENGINEERS' LEVELS

Lietz levels are manufactured in two different types, which we aim to constantly keep in stock, the **Y-Level** and the **Dumpy Level**.

In the manner of making these instruments, much that has been said of the transit will hold good and need not be repeated.

The three main qualities to be secured in a level are: **stability**, a **sensitive bubble** and a **powerful telescope**.

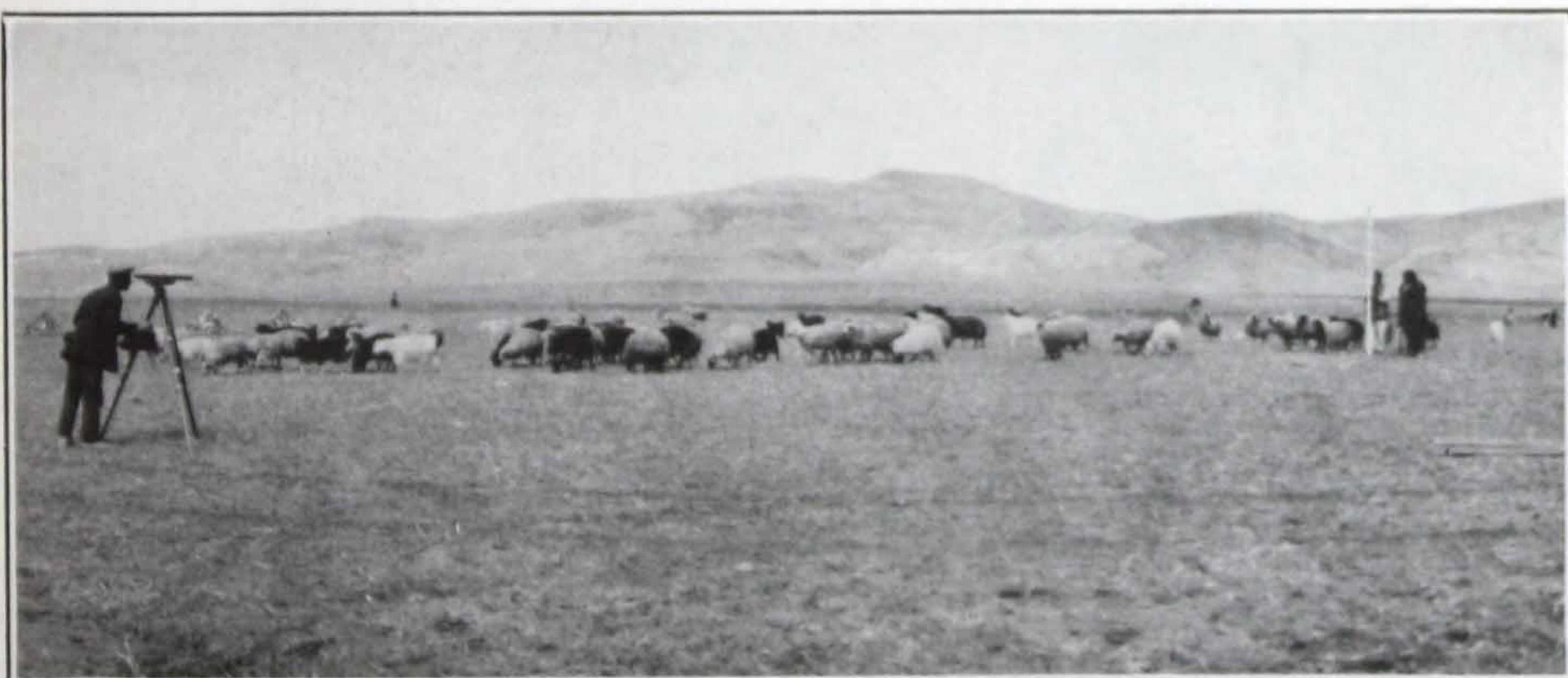
To secure the first we need only refer to the solid construction of the star shaped casting through which the leveling screws operate. The center, or spindle, is long and is continued through the clamp up to the bar which enables us to bring the center of gravity as near as possible to the tripod head. Great care is exercised in fitting the center to the socket and as these parts are made of the hardest composition, it is utterly impossible to wear them out even through years of constant use. The collars upon which the Y level telescope rests on the Y's are made of the hardest bell metal, are exactly equal in diameter and perfect cylinders. The level bars are strongly ribbed and designed to obtain rigidity and lightness in weight.

The telescope is the improved Lietz internal focusing type fully described on page 16 of this catalog. All standard Lietz levels are furnished with base plate and tripod head having a thread $3\frac{1}{2}$ " in diameter, 8 threads to the inch, in accordance with recommendations of the Manufacturers Sub Committee, Bureau of Standards, United States Department of Commerce.

While it is our desire to list in this catalog only such instruments for which there exists the greatest demand, we are prepared to make changes and to add any special features.

Precise levels of the highest grade and for the most exacting purpose can be made to order.

We invite your particular attention to the Lietz Geodetic Precise Level No. 19G illustrated and described on pages 52 to 53. This instrument combines great accuracy with simplicity and compares favorably in results obtained with the more complicated Precise Levels which sell at considerably higher prices.

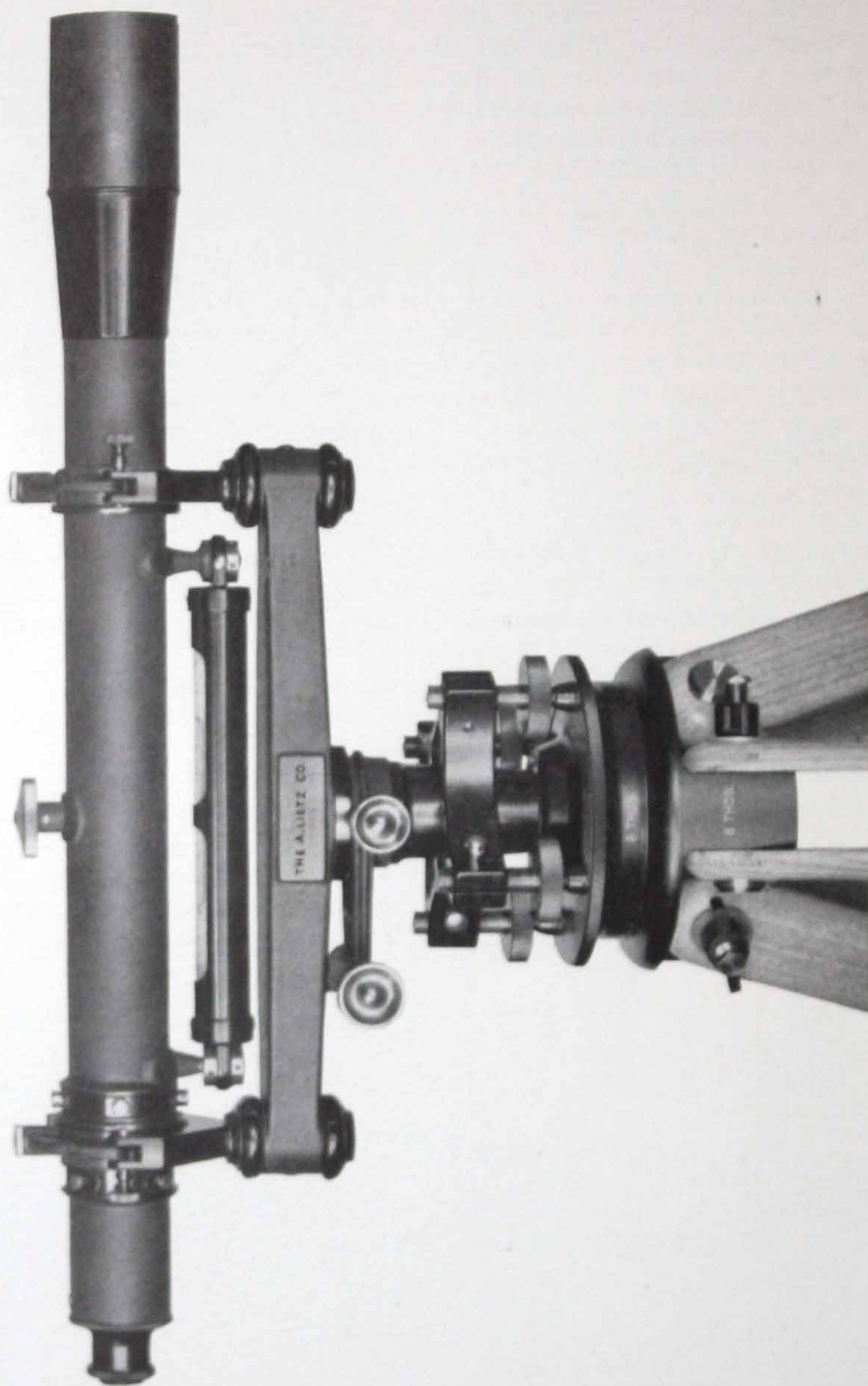


LIETZ LEVEL IN TURKEY

On Construction of Kayseri-Sivas Railroad

THE A. LIETZ COMPANY
SAN FRANCISCO, U. S. A.

MODERN ENGINEERS' AND
SURVEYORS' INSTRUMENTS



No. 19

LIETZ ENGINEERS' PRECISION Y LEVEL
Code Word, BUMBOAT

LIETZ ENGINEERS' WYE LEVEL No. 19

SPECIFICATIONS

Telescope—18 inches long, Object glass $1\frac{3}{4}$ in., INTERNAL FOCUSING, spiral rack and pinion movement, erecting eyepiece, MAGNIFYING POWER 32 diameters. Collars of hard bell metal. Spirit level 6 inches long graduated on glass, sensitiveness about 20 seconds. Level housing adjustable vertically and horizontally.

Center—Of hard bronze anti-friction alloys, long tapered and closely fitted. FOUR LEVELING SCREWS of special composition metal with deep threads. Improved CLAMP and TANGENT PIECE with connecting bar (see page 15). Tangent screws with counterspring.

Level Bar—Of hard bell metal. Improved ribbed construction designed to obtain greatest strength and rigidity. Wye clips provided with spring plungers to give uniform pressure to telescope collar.

Finish—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.

Tripod—Split leg type. Base Plate and tripod head having a thread of $3\frac{1}{2}$ " in diameter, 8 threads to the inch (U. S. Standard).

Accessories—Sunshade, adjusting pins, dust brush and screw driver. Polished mahogany case with lock, key and strap.

Weight—Level about 12 lbs. Tripod about 11 lbs.

Gross Weight—Level and tripod packed securely for shipment in two boxes about 60 lbs.

Code Word—BUMBOAT.

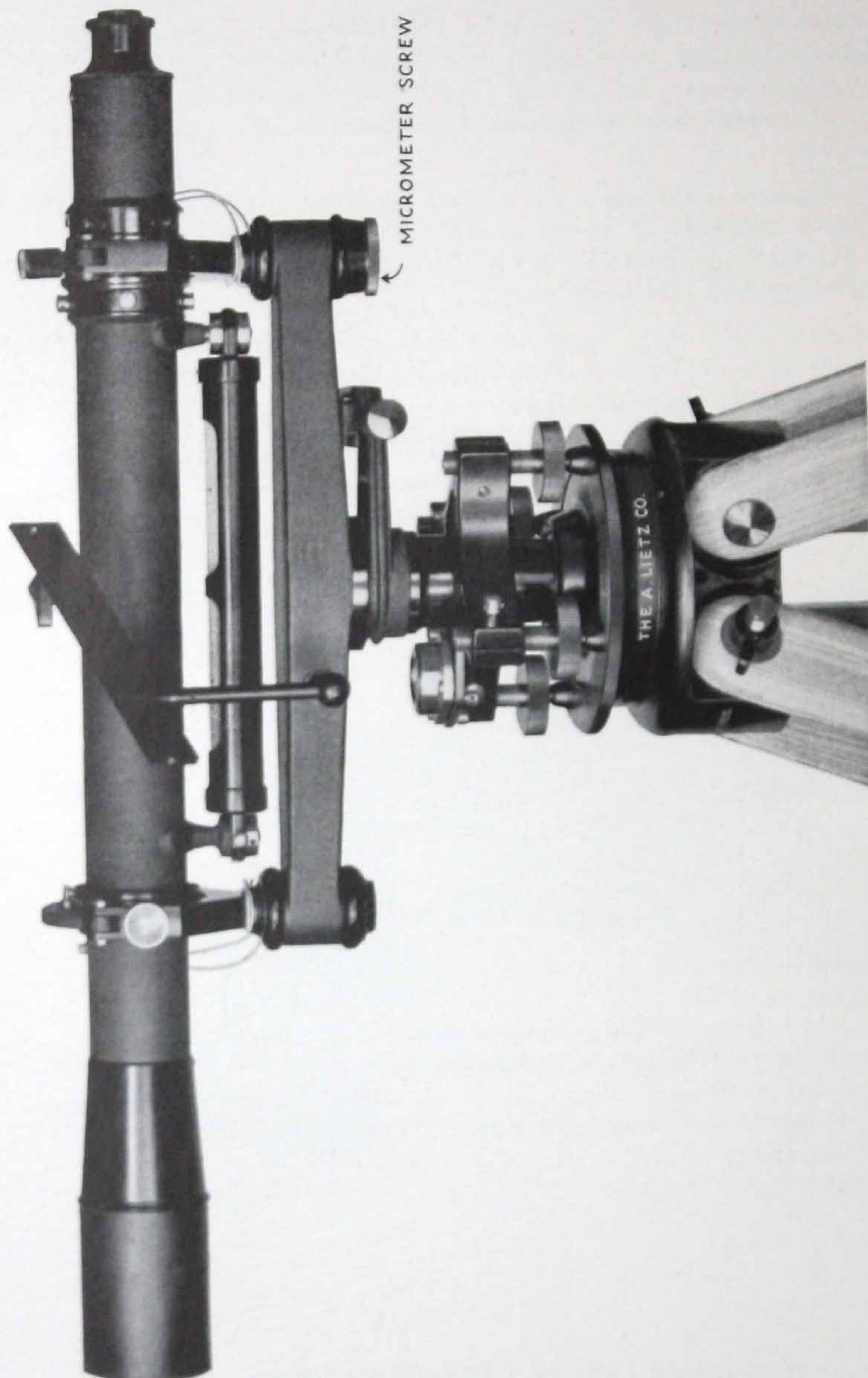
Extras for Y Level No. 19

	Code Word
Mirror to control bubble from eye end.....	CUPID
Stadia hairs fixed, set 1:100.....	CUPOLA
Reversion level to telescope with protection ring.....	CULTURE
Constructed with three leveling screws instead of four....	CULVERIN
Silk protection bag (waterproof).....	CURTAIN
Full extension tripod in lieu of straight legs.....	CUMBRANCE
Bottle of fine instrument oil.....	CUTEX
Inverting eyepiece (made to order only).....	CUTWATER

SEE PRICE LIST IN BACK OF CATALOG

THE A. LIETZ COMPANY
SAN FRANCISCO, U. S. A.

MODERN ENGINEERS' AND
SURVEYORS' INSTRUMENTS



No. 19G
LIETZ GEODETIC PRECISE LEVEL
Code Word, BUMBRAY

LIETZ GEODETIC PRECISE LEVEL No. 19G

An Instrument Combining Great Accuracy with Simplicity

With the Lietz Geodetic Precise Level **quicker** and **more accurate** results can be obtained than with the ordinary wye or dumpy level. This instrument is capable of doing the highest class of work, still is so **simple in construction** and design that it can be used for **all purposes** where a good level is required.

The feature by which this is accomplished consists principally of a micrometer screw for the vertical control of one of the wyes. With this the telescope can be raised or lowered at the eye end with greater speed and accuracy than can be obtained with the leveling screws.

The telescope is carefully pivoted, but can easily be relieved for testing of adjustments, which is done in the same manner as with the ordinary wye level. The adjustments of most precise levels can only be made in the laboratory with specially provided cradle. The Lietz Geodetic Precise Level has all the features of the more costly precise instruments but all adjustments, including the lateral adjustments, can be made in the field if necessary. A mirror is attached for the control of the level bubble from the eye end of the telescope. A circular level attached to the leveling head is for the purpose of leveling the instrument approximately. Through the unique construction of the pivoting arrangement and the fine micrometer screw, this level can readily be set to any reading within two or three seconds of arc. This has been accomplished by the careful grinding to the proper curvature, which together with the nature of the filament gives the bubble a free and rapid motion. The pivoting arrangement of the telescope avoids strain and offers the only correct construction for the control of a sensitive level vial.

SPECIFICATIONS

Telescope—18 inches long, Object glass $1\frac{5}{8}$ in., INTERNAL FOCUSING, spiral rack and pinion movement, erecting eyepiece, MAGNIFYING POWER 32 diameters. Collars of hard bell metal, spirit level 6 inches long graduated on glass, sensitiveness about 15 seconds. Level housing adjustable vertically and horizontally.

Center—Of hard bronze anti-friction alloys, long tapered and closely fitted. FOUR LEVELING SCREWS of special composition metal with deep threads. Improved CLAMP and TANGENT PIECE with connecting bar (see page 15). Tangent screws with counterspring.

Level Bar—Of hard bell metal. Improved ribbed construction designed to obtain greatest strength and rigidity. Micrometer screw for vertical control of one of the Y's with counterspring. The other Y is provided with pivoting arrangement for telescope. Circular level attached to leveling head for approximate leveling.

Finish—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.

Tripod—Split leg type, 61 inches long to facilitate reading bubble in mirror. Base Plate and tripod head having a thread $3\frac{1}{2}$ " in diameter, 8 threads to the inch (U. S. Standard).

Accessories—Sunshade, adjusting pins, dust brush and screw driver. Polished mahogany case with lock, key and strap.

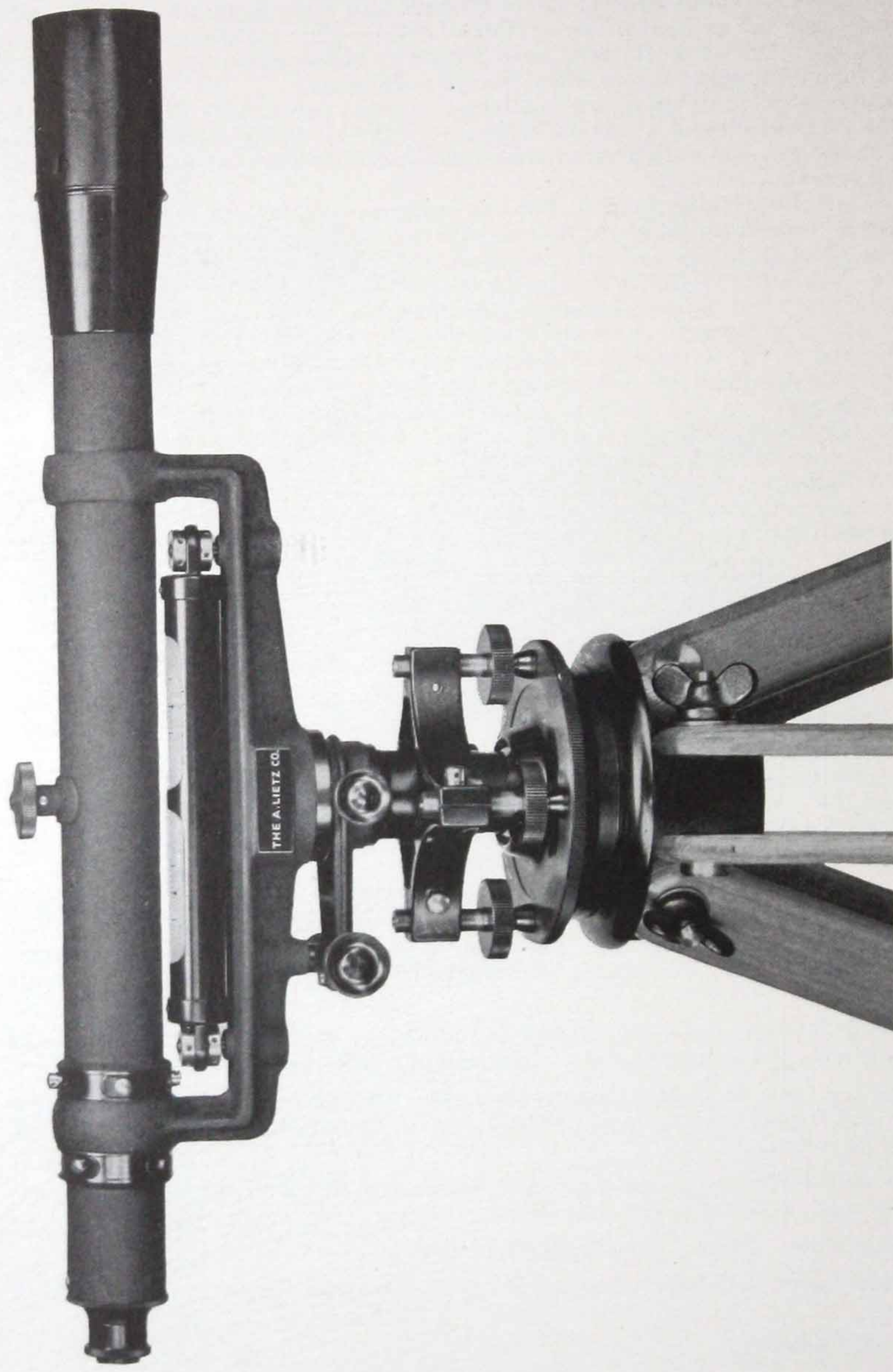
Weight—Level about 13 lbs. Tripod about 16 lbs.

Gross Weight—Level and tripod packed securely for shipment in two boxes about 65 lbs.

Code Word—BUMBRAY.

For Extras for Geodetic Precise Levels see page 51.

SEE PRICE LIST IN BACK OF CATALOG



No. 20T

LIETZ ENGINEERS' DUMPY LEVEL

Code Word, BURGESS

LIETZ ENGINEERS' DUMPY LEVEL No. 20T

SPECIFICATIONS

Telescope—18 inches long. Object glass $1\frac{3}{4}$ in., INTERNAL FOCUSING, spiral rack and pinion movement, erecting eyepiece, MAGNIFYING POWER 32 diameters. Spirit level 6 inches long graduated on glass, sensitiveness about 20 seconds.

Center—Of hard bronze anti-friction alloys, long tapered and closely fitted. FOUR LEVELING SCREWS of special composition metal with deep threads. Improved CLAMP and TANGENT PIECE with connecting bar (see page 15). Tangent screws with counterspring.

Level Bar—Of hard bell metal, improved ribbed construction designed to obtain greatest strength and rigidity with strong telescope supports.

Finish—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.

Tripod—Split leg type. Base Plate and tripod head having a thread $3\frac{1}{2}$ " in diameter 8 threads to the inch (U. S. Standard).

Accessories—Sunshade, adjusting pins, dust brush and screw driver. Polished mahogany case with lock, key and strap.

Weight—Level about 10 lbs. Tripod about 11 lbs.

Gross Weight—Level and tripod packed securely for shipment in two boxes about 55 lbs.

Code Word—BURGESS.

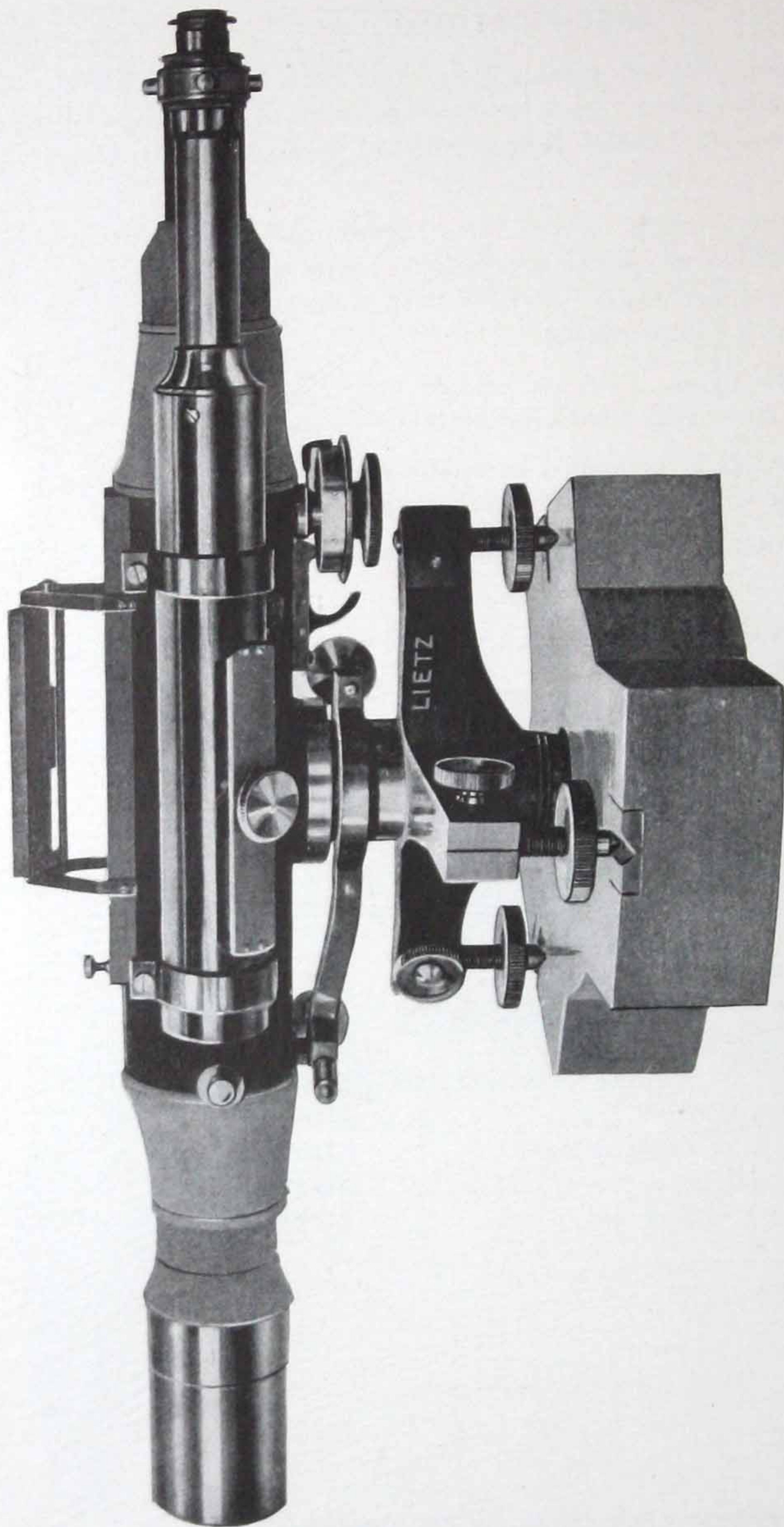
Extras for No. 20T

	Code Word
Mirror to control bubble from eye end.....	CUPID
Stadia hairs fixed, set 1:100.....	CUPOLA
Constructed with three leveling screws instead of four...	CULVERIN
Silk protection bag (waterproof).....	CURTAIN
Full extension tripod in lieu of straight legs.....	CUMBRANCE
Bottle of fine instrument oil.....	CUTEX
Inverting eyepiece (made to order only).....	CUTWATER

SEE PRICE LIST IN BACK OF CATALOG

THE A. LIETZ COMPANY
SAN FRANCISCO, U. S. A.

MODERN ENGINEERS' AND
SURVEYORS' INSTRUMENTS



No. 20G

LIETZ PRECISE LEVEL

Design of the U. S. Coast and Geodetic Survey
Code Word, **BURGUNDY**

LIETZ PRECISE LEVEL No. 20G

U. S. Coast and Geodetic Survey Design

The United States Coast and Geodetic Survey Precise Level is of the Dumpy Type, and is designed to meet the demand for an instrument whereby the greatest precision possible in leveling can be obtained. In the construction of this instrument we follow in every respect the specifications of the United States Coast and Geodetic Survey. The use of nickel iron, with coefficient of expansion of 0.000004 per degree Centigrade, in connection with nickel steel with coefficient of expansion of 0.000001 per degree Centigrade, assures of a permanency of adjustment of this instrument under decided changes of temperature. The instrument has a fixed adjustment between the line of collimation and the level. The level is set partially within the telescope and as near as possible to the line of collimation.

Specifications

TELESCOPE—17 inches long, inverting, magnifying power about 40×, object glass, $1\frac{3}{4}$ inches diameter.

LEVEL TO TELESCOPE— $5\frac{3}{4}$ inches long, chambered, graduated 2-mm. divisions; sensitiveness to 2" arc.

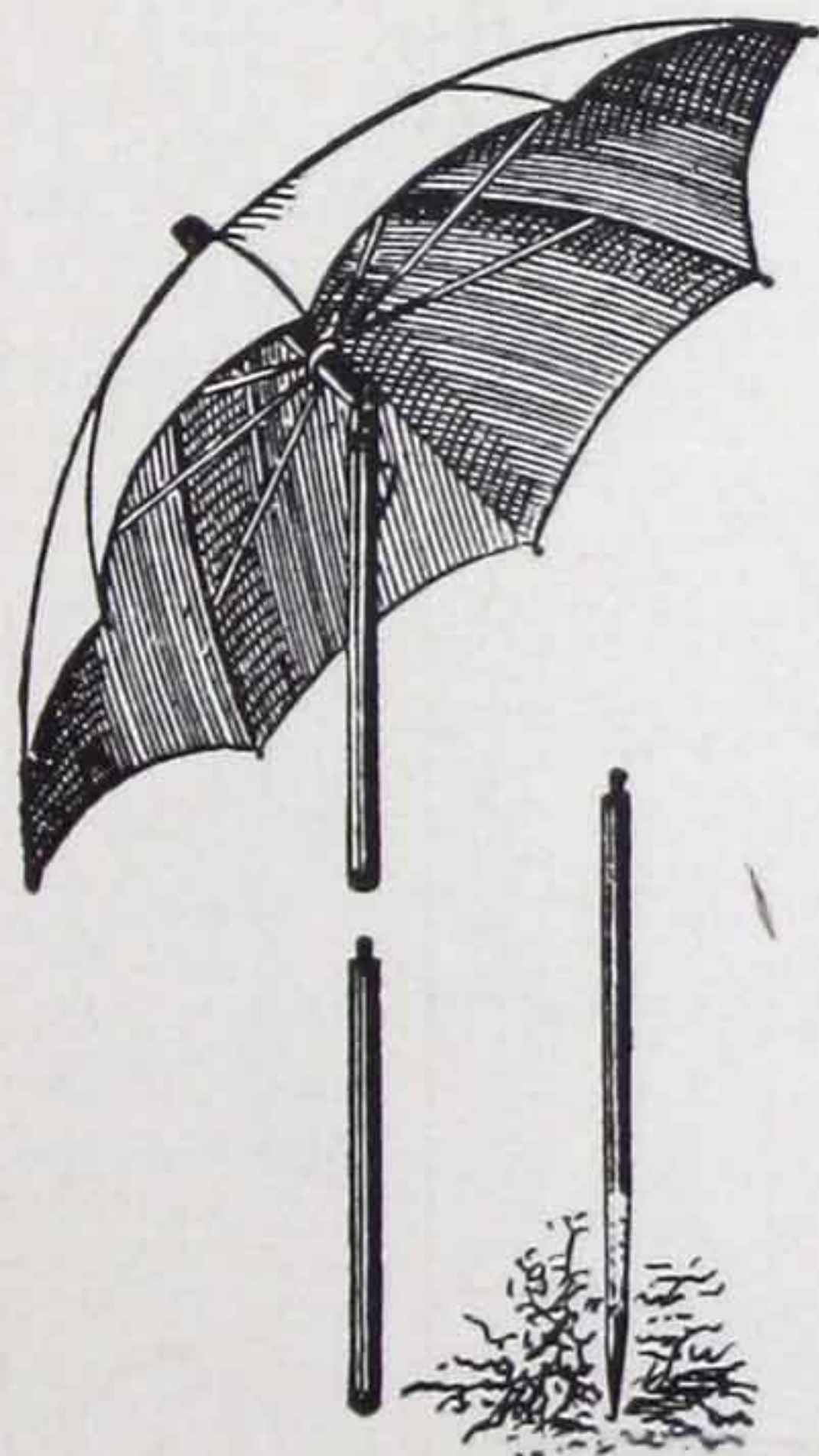
STADIA HAIRS—Set 30 cm. to 100 meters.

MICROMETER SCREW—Has head divided into 100 parts, 100 revolutions to one inch, provided with cam for lifting telescope from micrometer screw when not in use.

WEIGHT—Instrument, about 14 lbs.; tripod, about 19 lbs.; box, about 16 lbs.

Code Word, **BURGUNDY**

SURVEYOR'S UMBRELLAS

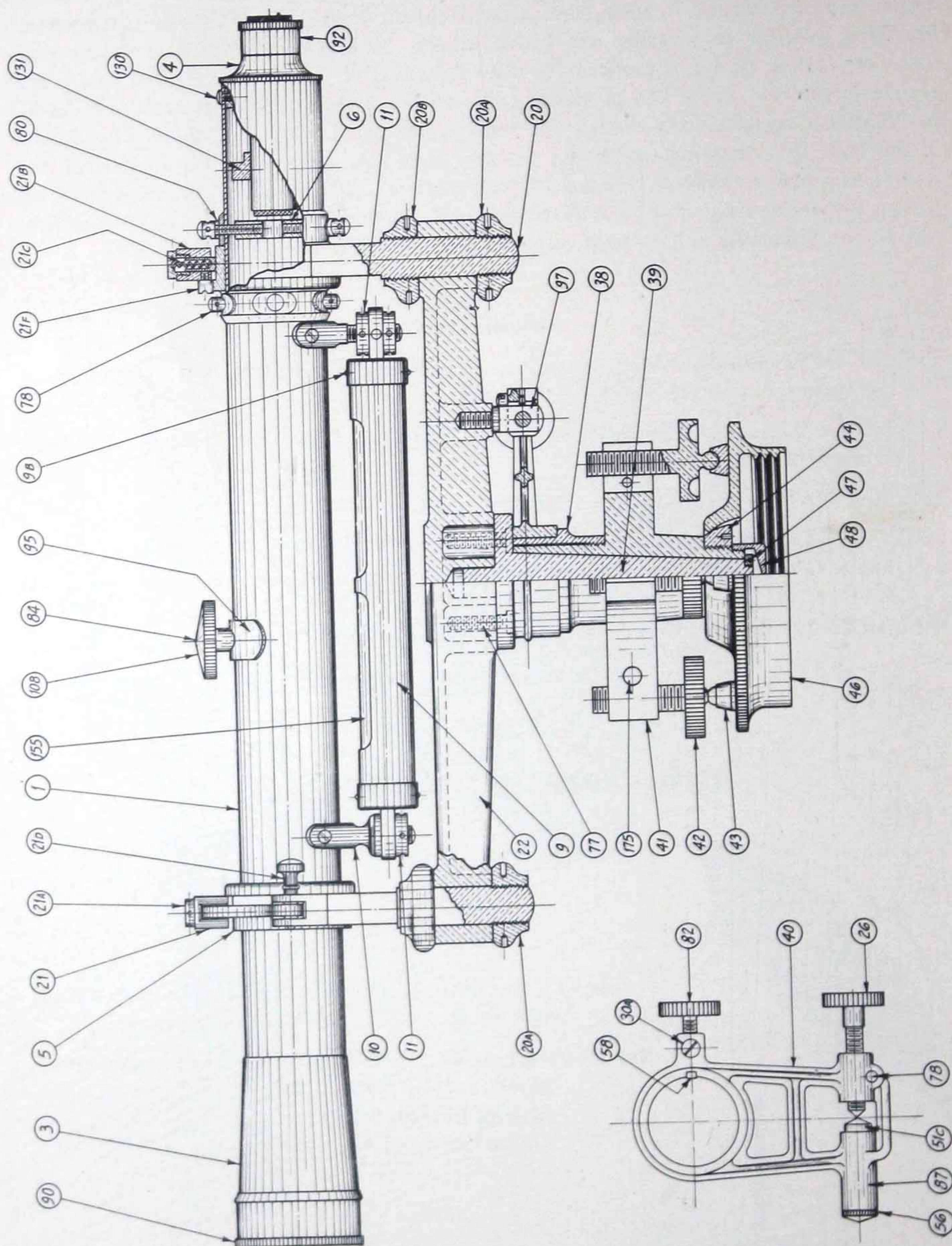


These Umbrellas are rattan ribbed so as not to deflect the compass needle. They are light and strong.

No. 28 (Old No. 58). Surveyor's Umbrella, heavy brown duck, rattan ribbed, about 6-foot spread, with tilting device; jointed handle 7 feet long with metal spear point. . . . Code Word, **ECHELON**

SEE PRICE LIST IN BACK OF CATALOG

CROSS SECTION OF LIETZ LEVEL

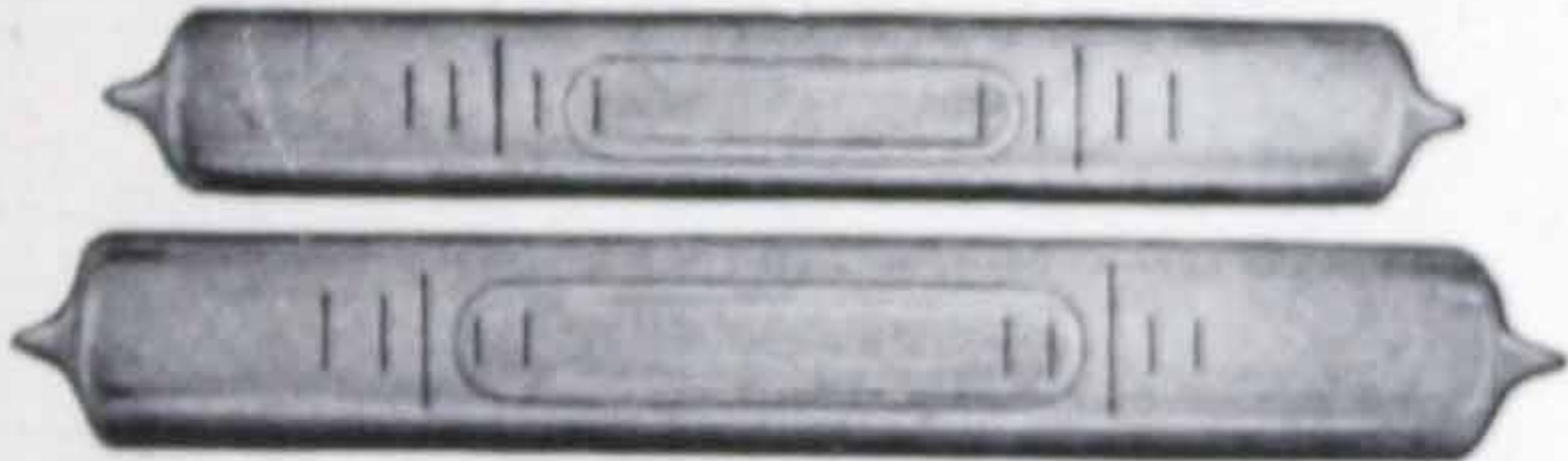


PARTS OF LEVEL SUSCEPTIBLE TO LOSS
OR INJURY

Kindly order by piece number, giving serial number of instrument. It must be borne in mind that vital parts of precision instruments cannot be made interchangeable. Needed screws are best ordered by sending broken portions.

Piece		Piece	
No. 1.	Telescope.	No. 26.	Tangent screw.
No. 2.	Slide.	No. 38.	Collar.
No. 2½.	Sun shade.	No. 39.	Spindle.
No. 3.	Objective head.	No. 40.	Lower clamp.
No. 4.	Eye end.	No. 41.	Starpiece.
No. 5.	Telescope axis.	No. 42.	Leveling screw.
No. 6.	Cross Hair frame.	No. 43.	Leveling screw cups.
No. 9.	Tel. level housing.	No. 44.	Ball.
No. 9B.	Tel. level end fast. screw.	No. 46.	Baseplate.
No. 10.	Tel. level brackets.	No. 47.	Spindle nut.
No. 11.	Tel. level adjusting nuts.	No. 48.	Bottom cap.
No. 13.	Diaphragm (not shown).	No. 51C.	Plunger.
No. 20.	Standards.	No. 56.	Plunger cap.
No. 20A.	Lower nuts to standard.	No. 77.	Bar fastening screw.
No. 20B.	Upper nuts to standard.	No. 78.	Cross Hair frame screw.
No. 21.	Clasp.	No. 80.	Cross Hair frame washer.
No. 21A.	Cap.	No. 82.	Plate clamp screw.
No. 21B.	Plunger.	No. 84.	Pinion Head screw.
No. 21C.	Plunger spring.	No. 87.	Spring not shown.
No. 21D.	Lock pins.	No. 90.	Dust cap.
No. 21E.	Hinge pins (not shown).	No. 97.	Abutting piece.
No. 21F.	Stop pin to Telescope.	No. 130.	Eyepiece focusing screw.
No. 22.	Bar.	No. 131.	Eyepiece reinforcing ring.

LIETZ GRADUATED AND GROUND LEVEL VIALS



Prices of Level Vials Only, Without Housing

- Level Vials for Telescopes of Transits and Levels. Per inch of length (unmounted)...
- Level Vials for Plate and Standard of Transits (unmounted).....
- Circular Level Vial (as furnished with our Hydrographic Y Level and Alidades)...

PLAIN LEVEL VIALS, NOT GRADUATED OR GROUND

- Plain Level Vials, not graduated, 1 to 4 inches long, each.....
- Plain Level Vials, not graduated, 4½ to 6 inches long, each.....
- For replacing broken level vials we suggest the sending of the housing for which the level vial is intended to insure proper size.
- Extra for mounting any size.....

SEE PRICE LIST IN BACK OF CATALOG

LIETZ PLANE TABLE OUTFITS



Lietz Plane Table Outfit consisting of No. 31 Alidade with trough compass No. 34A, No. 34B Lietz Tangent Head Tripod, No. 34F Drawing Board size 24x31 with holding-down thumbscrews, and No. 34L Plumbing Arm and Plummet.

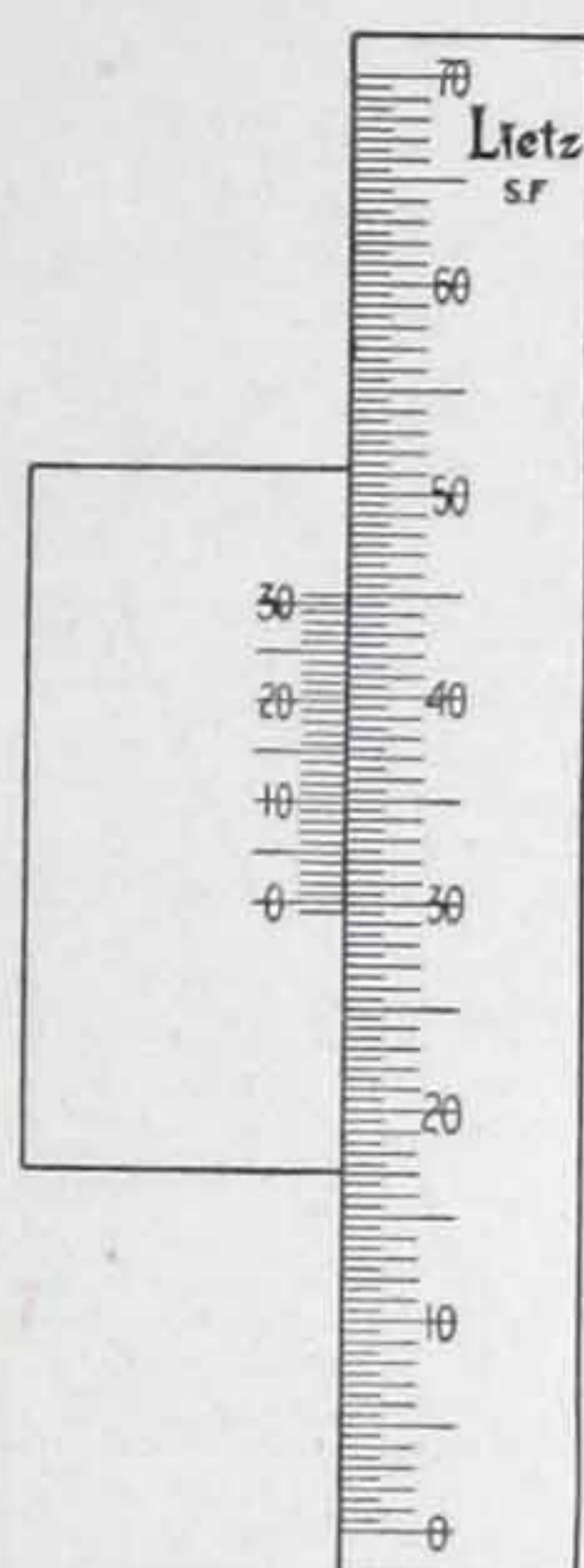
For further description see pages 61 to 72

LIETZ ALIDADES

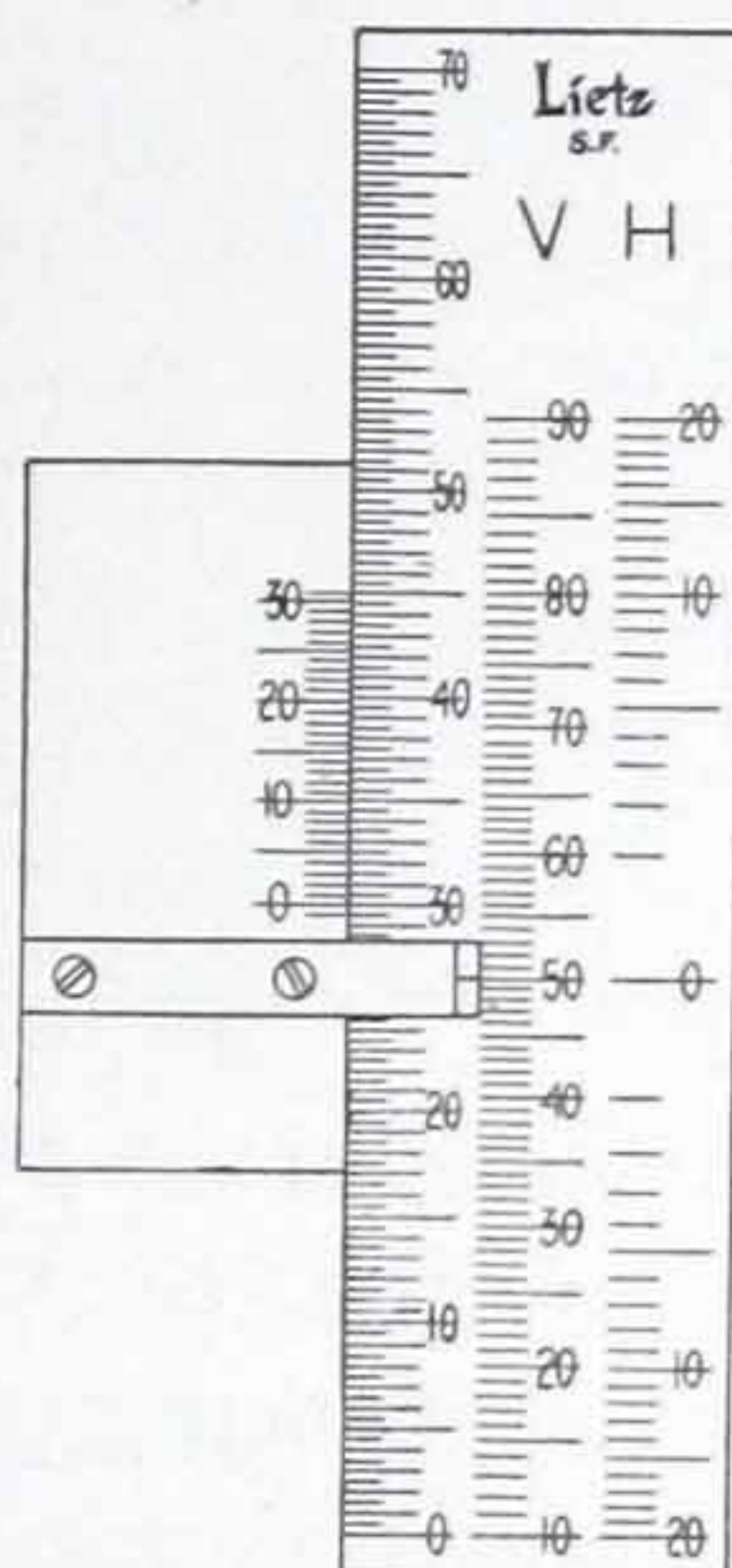
Lietz Alidades are now made in several forms or modifications to meet the various requirements of the profession. They fill a long-felt want for a high-grade instrument of this kind. The telescope has definition, light and power in a high degree and revolves 180 degrees on its longitudinal axis for adjustment and control of the line of collimation.

GRADUATIONS OF ARC AND VERNIER

The vertical arc is graduated on the periphery and set at an angle for convenient reading of the vernier. The index of the vernier is at 30 instead of 0; therefore all angles as read are positive, eliminating the possibility of error in the notes.



Illustrating graduation of vertical arc, vernier reading to minutes.



Illustrating graduation of Beaman stadia arc, vernier reading to minutes.

THE BEAMAN STADIA ARC

A practical attachment for transits and alidades by which inclined stadia readings are reduced to horizontal or vertical distances using only simple arithmetical computations and without the use of either verniers, tables, slide rules or diagrams.

This device consists essentially of an arc having two graduated scales, the arc being attached to the vertical limb on the transit, and identical with the regular vertical arc on the alidade. The scales are graduated as accurately as the degree scales on the vertical circle and the results obtained are identical with those obtained by the use of tables or formulae.

The stadia arc carries two scales:

V—A scale for determining differences in elevation (Vertical Distances.)

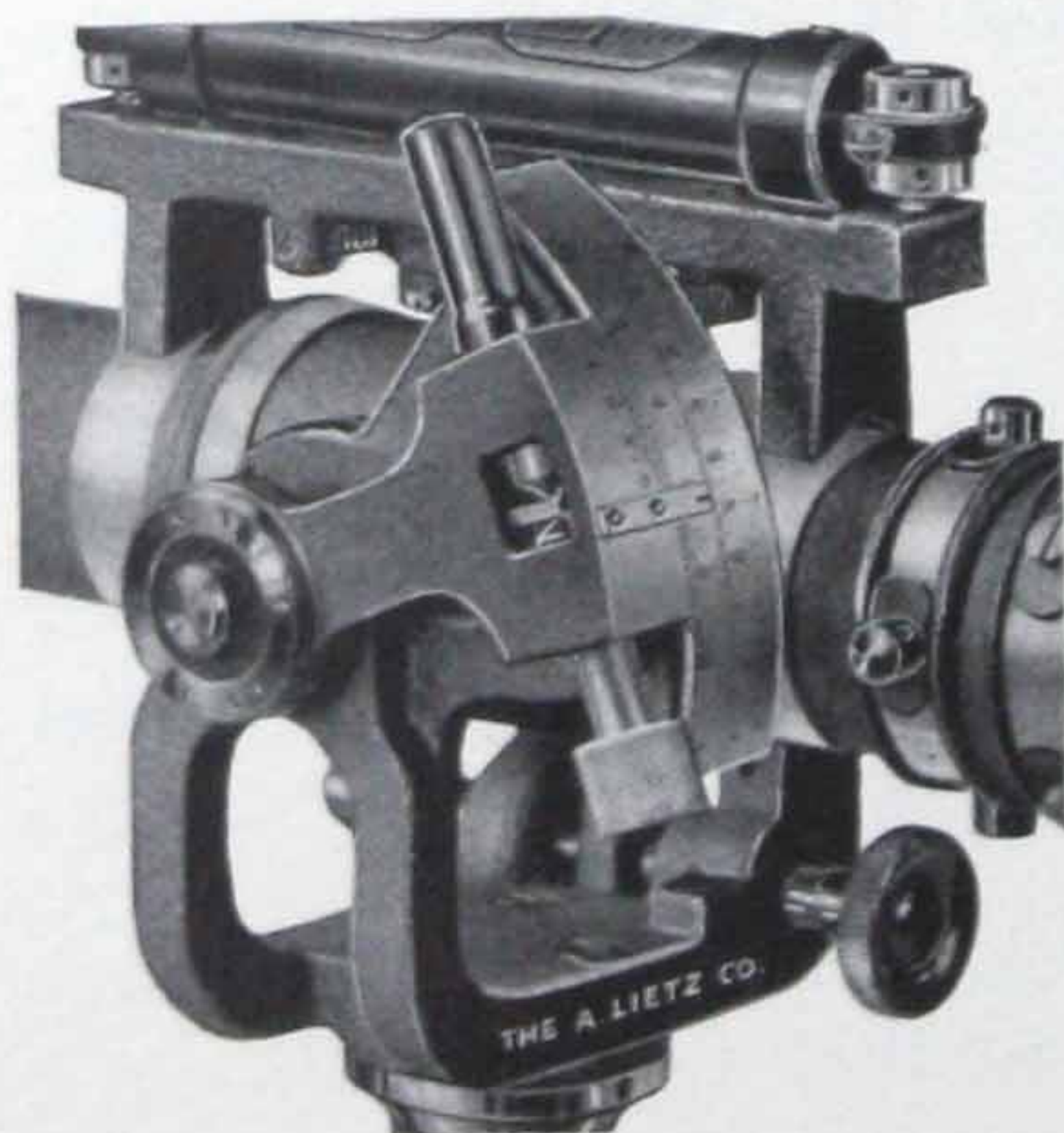
H—A scale for reducing inclined stadia readings to horizontal.

Instead of being graduated in degrees like the vertical circle, the V scale is so graduated that only those angles are used for which differences in the vertical distance, at an observed distance of 100 feet are simple multiples of the rod interval; i. e., those angles for which the function $\frac{1}{2} \sin 2a$ is a simple multiple. The index point of the V scale is 50 instead of zero, so that a direct reading of the scale will show whether the difference in elevation is plus or minus, thus avoiding the possibility of error.

In using the multiple scale, starting with the index point at fifty and the telescope level, each graduation indicates a difference in elevation of one foot at a distance of 100 feet from the telescope. The observer reads the rod interval in the usual manner, then turns the tangent screw until the index line is opposite the nearest line on the V scale and notes the rod reading at the middle cross hair. The difference in elevation between the height of the instrument and the rod reading at the middle cross hair is then computed by multiplying the rod interval by the reading on the V scale minus 50. For example, suppose the multiple scale reads 36 and the rod interval 2.5 feet. The difference in elevation between the height of the instrument and the rod reading will be $(36 - 50) \times 2.5 = -14 \times 2.5 = -35$. Subtracting the rod reading from the elevation thus obtained gives the actual elevation, the entire computation being made mentally in a few seconds, with hardly any practice being required.

The graduations on the H scale give the ratio of the horizontal distance correction to the distance read, expressed as a per cent. The horizontal distance is therefore computed by multiplying the observed distance by the reading on the horizontal scale and subtracting the product from the observed distance. In the above example, the reading on the H scale will be 3, that is 3% and the horizontal distance will be $250 - (.03 \times 250) = 242.50$.

TANGENT MOVEMENT TO VERNIER ARM



A recent improvement consists of a tangent movement to the vernier arm, which permits setting the vernier exactly at index when the telescope level is centered, irrespective of a possible slight tilt of the drawing board, and the subsequent reading of the vertical angle can be recorded directly by one reading of the arc.

THE STRIDING LEVEL

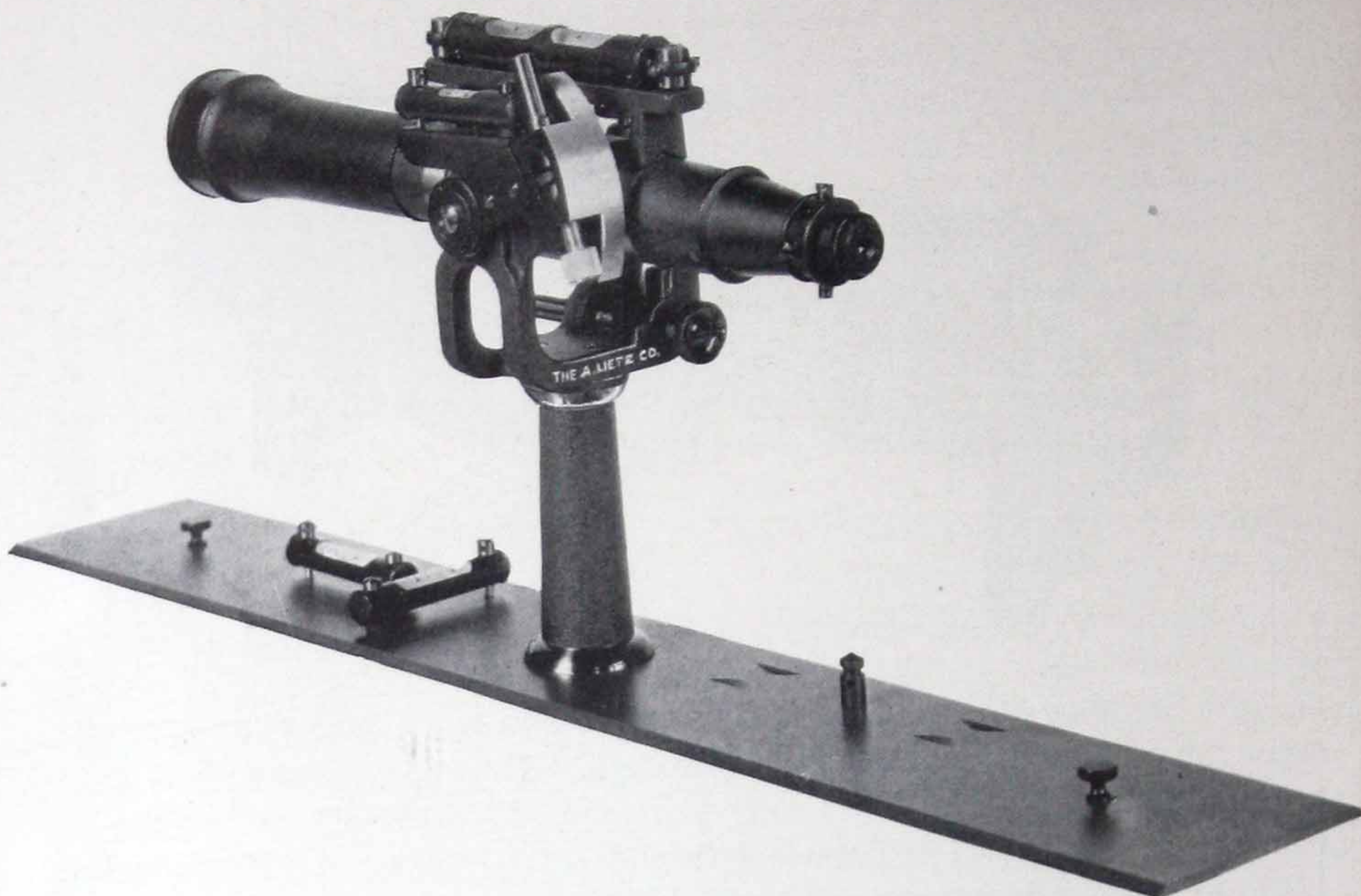


The Striding Level is long and sensitive and has a neat snap arrangement for quickly attaching to the telescope. The collars on which it rests are made of our special hard alloy to insure of long wear. When not in use, the striding level is detached from the telescope and placed on the blade for safe and compact packing.

THE TROUGH COMPASS



Our improved form of trough compass may be mounted on the blade of the instrument or countersunk into the edge of the drawing board. This is carefully constructed. The Magnetic needle is of the same high quality as those in our transits. The case is made water-tight and wind-proof and the lifting arrangement is by means of a lever. Graduated 5 degrees both sides of zero.



No. 30

LIETZ PRECISION ALIDADE

This instrument has been designed for topographic surveying of the highest type. The telescope is inverting and has power, light and definition in a high degree. The instrument is sturdy and light. The level on the vernier arm insures a complete control of the vernier position for vertical angles, regardless of the telescope level. It affords a quick setting by means of the level and assures of greater accuracy and saves time, for the reason that the first reading of the vernier is eliminated.

Dimensions and Weights

Length of telescope.....	15 inches
Diameter of objective.....	1 ³ / ₈ "
Magnifying power.....	35×
Size of blade.....	22 inches long, 3 ¹ / ₂ inches wide
Weight.....	about 8 ¹ / ₂ lbs.

LIETZ PRECISION ALIDADE No. 30

Specifications

Telescope—15 inches long, with clamp and tangent revolving 180° on its longitudinal axis. Object glass 1¾ in., EXTERNAL FOCUSING SYSTEM, spiral rack and pinion movement, inverted eyepiece, MAGNIFYING POWER 35 diameters. Cross and stadia hairs fixed, set 1:100.

Striding Level—3½ inches long with improved snap arrangement for attaching to telescope. Graduated on glass, sensitiveness about 30 seconds.

Vertical Arc—Graduated on the periphery on solid silver with vernier reading to minutes. Tangent movement and control level attached to vernier arm.

Alidade Blade—22 inches long and 3½ inches wide, finished on underside with white celluloid paint to prevent soiling of drawing paper. Beveled on both edges, fitted with circular spirit level and finger buttons for conveniently orienting alidade.

Finish—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.

Accessories—Sunshade, dust brush, adjusting pins, screw driver, polished mahogany case with lock, key and strap.

Weight—Alidade about 8½ lbs.

Gross Weight—Alidade securely packed for shipment about 40 lbs.

Code Word—CORDALITE.

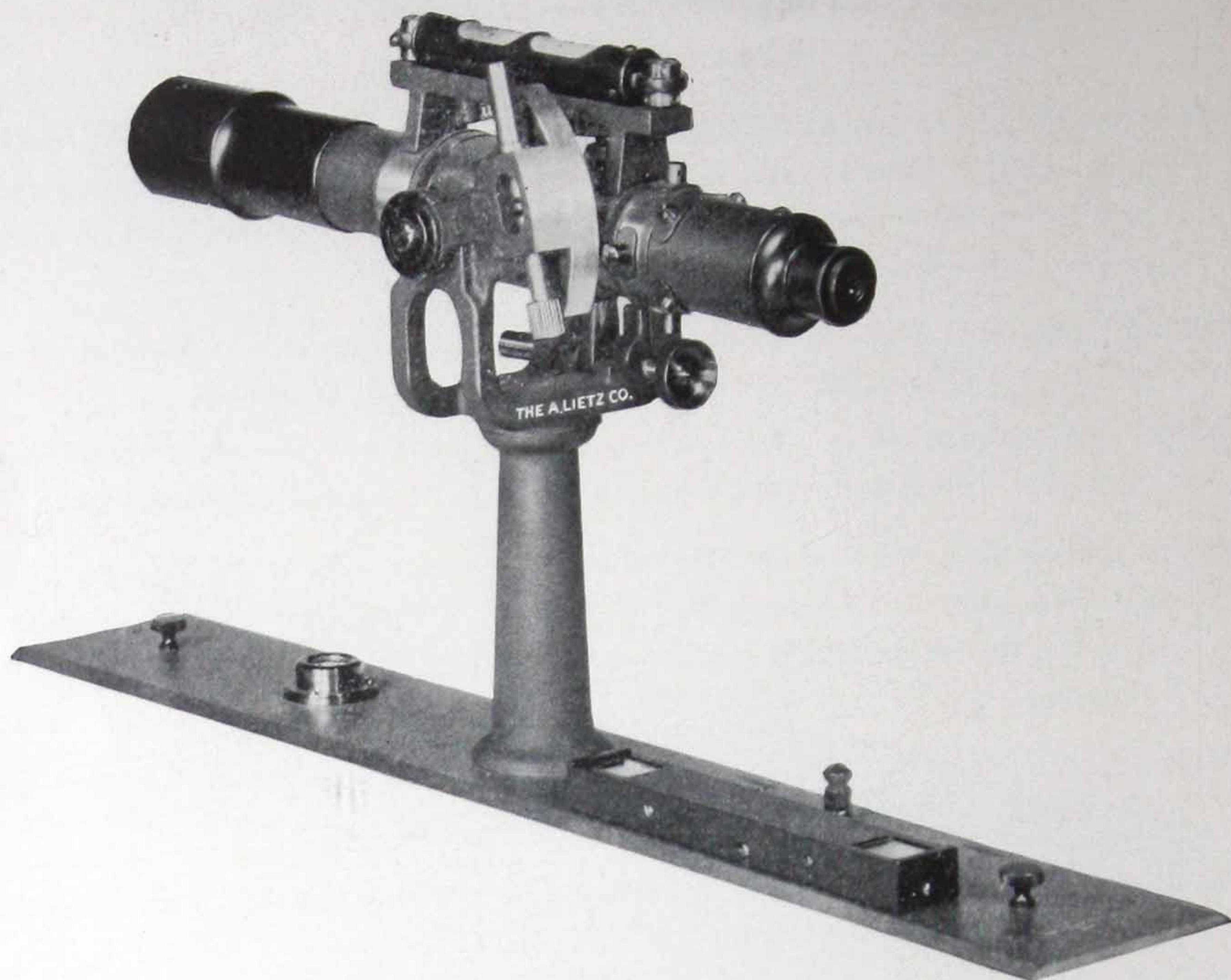
Extras for Alidade No. 30

	Code Word
Prism to eye-piece.....	CUMBERSOME
Gradienter attachment to vertical motion with movable head.....	CULPABLE
Trough compass with 3½ inch needle mounted on blade.....	DROUGHT
Quarter hair in upper field.....	DIALECT
Parallel straight edge attachment to blade.....	DIALOGUE
Beaman stadia arc.....	DIAMOND

For parts susceptible to loss or breakage see page 67.

For tripods, boards and other accessories see pages 71-73.

SEE PRICE LIST IN BACK OF CATALOG



No. 31

LIETZ ALIDADE

	Code Word
Alidade.....	CORDATE
Trough Compass with 3½ inch needle.....	DROUGHT

U. S. Geological Survey Standard Type

Dimensions and Weights

Length of telescope.....	11 inches
Diameter of objective.....	1⅜ "
Magnifying power.....	24×
Size of blade.....	18 inches long, 3 inches wide
Weight.....	About 7 lbs.

LIETZ PRECISION ALIDADE No. 31

Specifications

Telescope—11 inches long with clamp and tangent, revolving 180° on its longitudinal axis. Object glass $1\frac{1}{2}$ in. EXTERNAL FOCUSING SYSTEM, spiral rack and pinion movement, erecting eyepiece, MAGNIFYING POWER 24 diameters. Cross and stadia hairs fixed, set 1:100.

Striding Level— $3\frac{1}{2}$ inches long with improved snap arrangement for attaching to telescope. Graduated on glass, sensitiveness about 30 seconds.

Vertical Arc—Graduated on the periphery on solid silver with vernier reading to minutes.

Alidade Blade—18 inches long and 3 inches wide, finished on underside with white celluloid paint to prevent soiling of drawing paper. Beveled on both edges, fitted with circular spirit level and finger buttons for conveniently orienting alidade.

Finish—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.

Accessories—Sunshade, dust brush, adjusting pins, screw driver, polished mahogany case with lock, key and strap.

Weight—Alidade about 7 lbs.

Gross Weight—Alidade securely packed for shipment about 35 lbs.

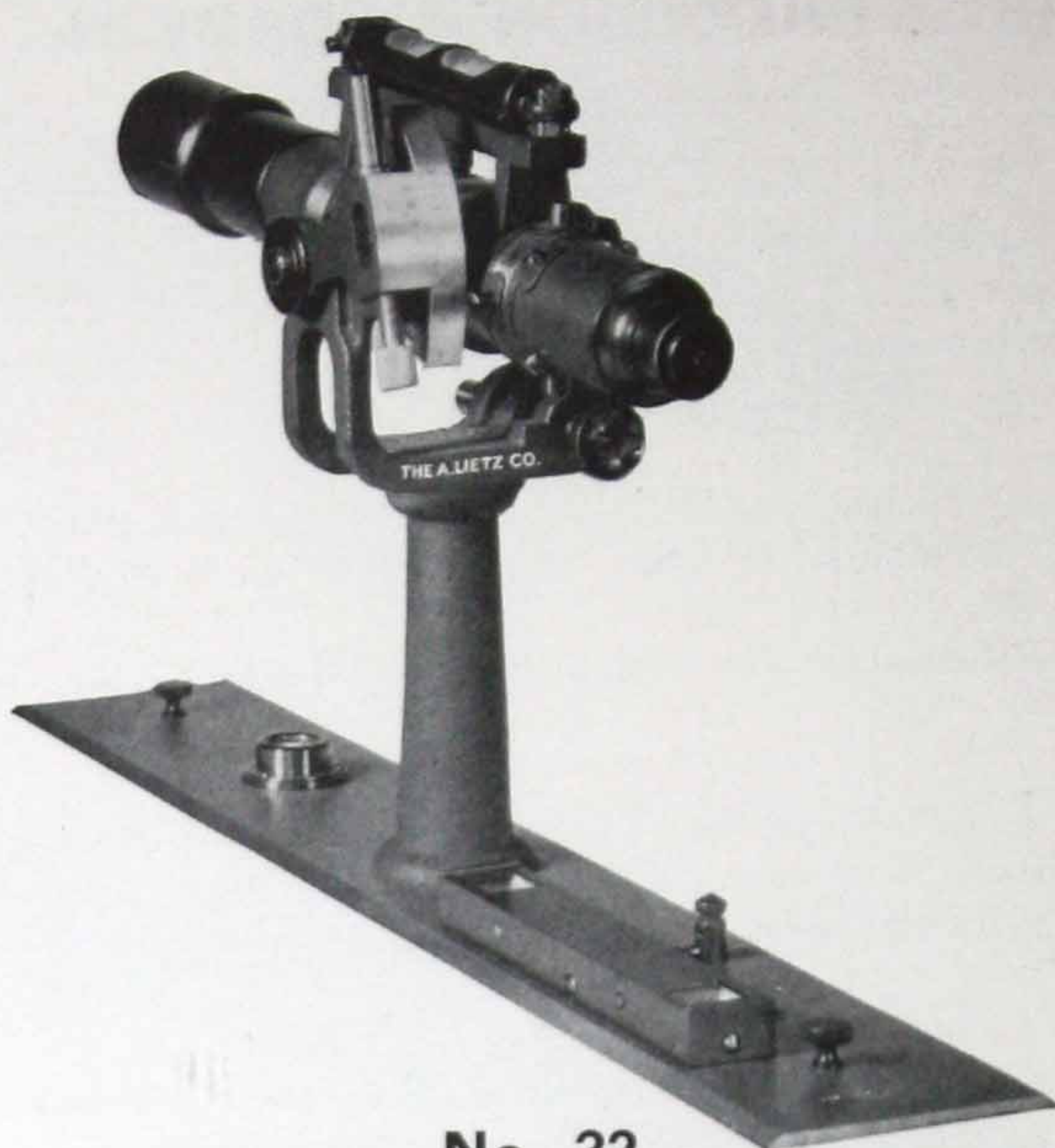
Code Word—CORDATE.

Extras for Alidade No. 31

	Code Word
Prism to eye-piece.....	CUMBERSOME
Gradienter attachment to vertical motion with movable head.....	CULPABLE
Level attached to vernier arm for control of zero on vernier.....	DIAGNOSE
Trough compass with $3\frac{1}{2}$ inch needle mounted on blade.....	DROUGHT
Quarter hair in upper field.....	DIALECT
Parallel straightedge attachment to blade.....	DIALOGUE
Beaman stadia arc.....	DIAMOND
Inverting eye-piece (made to order only).....	CUTWATER

Parts susceptible to loss or breakage

Extra striding level complete.....	DIBBER
For level vial only see page 50.	
Extra circular spirit level for blade.....	DICKY

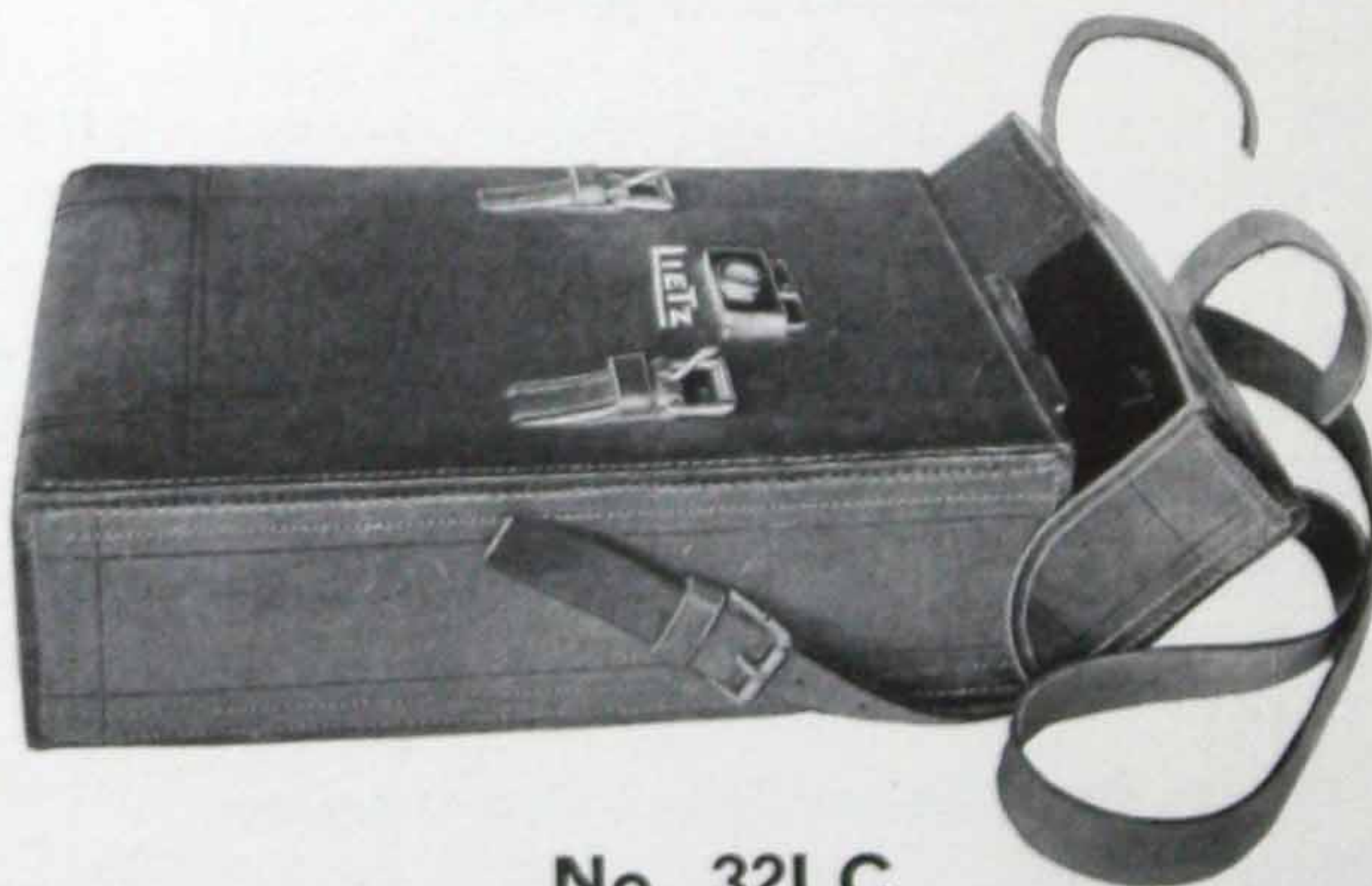


No. 32

LIETZ ALIDADE

Stanford Geological type, 8½-inch telescope, 14-inch blade. Fitted with trough compass.

Alidade.....	Code Word
Trough Compass with 3½ inch needle.....	CORDWAIN
	DROUGHT



No. 32LC

Same as No. 32, but in leather carrying case instead of mahogany box.
Code Word, **CORDWEIGHT**

LIETZ PRECISION ALIDADES Nos. 32 to 32LC

Stanford Geological Type

These instruments are of the same type and embody the same characteristics as our No. 31, but they are somewhat smaller in size. They are recommended for the best class of work, where a light, compact and portable instrument is desirable. The leather case, furnished with No. 32LC, is velvet lined and has shoulder strap, making an especially light and convenient means of carrying.

Specifications Alidade No. 32

Telescope—8½ inches long, with CLAMP and TANGENT, revolving 180° on its longitudinal axis. Object glass 1 in., EXTERNAL FOCUSING SYSTEM, spiral rack and pinion movement, erecting eyepiece, MAGNIFYING POWER 18 diameters. Cross and stadia hairs fixed, set 1:100.

Striding Level—3½ inches long with improved snap arrangement for attaching to telescope. Graduated on glass, sensitiveness about 30 seconds.

Vertical Arc—Graduated on the periphery on solid silver with vernier reading to minutes.

Alidade Blade—14 inches long and 3 inches wide, finished on underside with white celluloid paint to prevent soiling of drawing paper. Beveled on both edges, fitted with circular spirit level and finger buttons for conveniently orienting alidade.

Finish—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.

Accessories—Sunshade, dust brush, adjusting pins, screw driver, polished mahogany case with lock, key and strap.

Weight—Alidade about 6 lbs.

Gross Weight—Alidade securely packed for shipment about 30 lbs.

Code Word—CORDWAIN.

ALIDADE No. 32LC

Same as No. 32, but in strong compact leather carrying case with shoulder strap instead of mahogany case, with all accessories neatly fitted.

Code Word—CORDWEIGHT.

Extras for Nos. 32 to 32LC

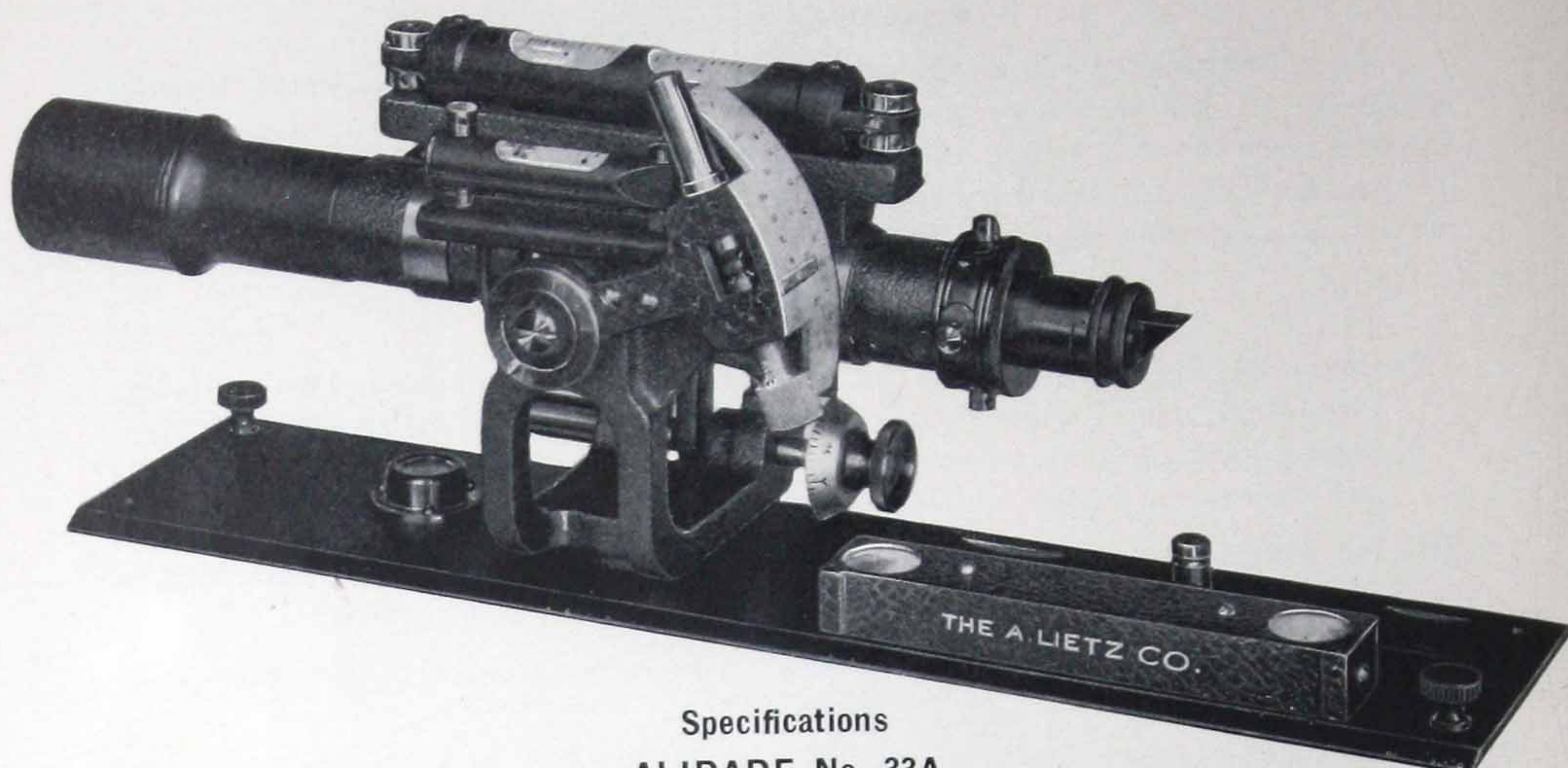
	Code Word
Prism to eyepiece.....	CUMBERSOME
Gradiometer attachment to vertical motion with movable head.....	CULPABLE
Level attached to vernier arm for control of zero on vernier.....	DIAGNOSE
Trough compass with 3½ inch needle mounted on blade.....	DROUGHT
Quarter hair in upper field.....	DIALECT
Parallel straight edge attachment to blade.....	DIALOGUE
Beaman stadia arc.....	DIAMOND
Inverting eyepiece (made to order only).....	CUTWATER

For parts susceptible to loss or breakage see page 67.

For tripods, boards and other accessories see pages 71-73.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ GEOLOGISTS' ALIDADES Nos. 33 and 33A



Specifications

ALIDADE No. 33A

- Telescope**—8½ inches long with CLAMP and TANGENT and gradienter screw with movable head revolving 180° on its longitudinal axis. Object glass 1 in., EXTERNAL FOCUSING SYSTEM, spiral rack and pinion movement, MAGNIFYING POWER 10.8 diameters with extra large field. Cross and stadia hairs fixed, set 1:100, quarter hair in upper field, prism to eyepiece.
- Striding Level**—3½ inches long with improved snap arrangement for attaching to telescope. Graduated on glass, sensitiveness about 30 seconds.
- Vertical Arc**—Graduated on the periphery on solid silver with vernier reading to minutes. Beaman Stadia Arc. Tangent movement and control level attached to vernier arm.
- Trough Compass**—Needle 3½ inches long, graduated 5° both sides of 0. Watertight and dust proof.
- Alidade Blade**—12 inches long and 3 inches wide, finished on underside with white celluloid paint to prevent soiling of drawing paper. Beveled on both sides, fitted with circular spirit level and finger buttons for conveniently orienting alidade.
- Finish**—Special Torchon finish developed to reduce the coefficient of expansion and contraction. Dark and durable and weather resisting.
- Accessories**—Sunshade, dust brush, adjusting pins, screw driver, strong leather case with shoulder strap.
- Weight**—Alidade about 6 lbs.
- Gross Weight**—Alidade securely packed for shipment about 30 lbs.
- Code Word**—CORIANTEX.

ALIDADE No. 33

Same as No. 33A. MAGNIFYING POWER 18X.
Code Word—CORIANDER.

Extras for Nos. 33 and 33A

Parallel straight edge attachment to blade.....		Code Word	DIALOGUE
Graduation of blade to inches and 50th.....	per edge		DIABAN
Graduation of blade special.....	per edge		DIANA
The eyepieces of the above instruments are interchangeable. An extra eyepiece can be furnished with either instrument.			
Extra high power eyepiece.....	Code word,		DIATEX
Extra low power eyepiece.....	Code word,		DIALOW

For plane tables and accessories see pages 71-73.

LIETZ PLANE TABLE OUTFITS

THE DRAWING BOARD

A drawing board, especially constructed for field use, and fitted with countersunk holding-down screws for drawing paper, is mounted on a tripod with a specially constructed head.

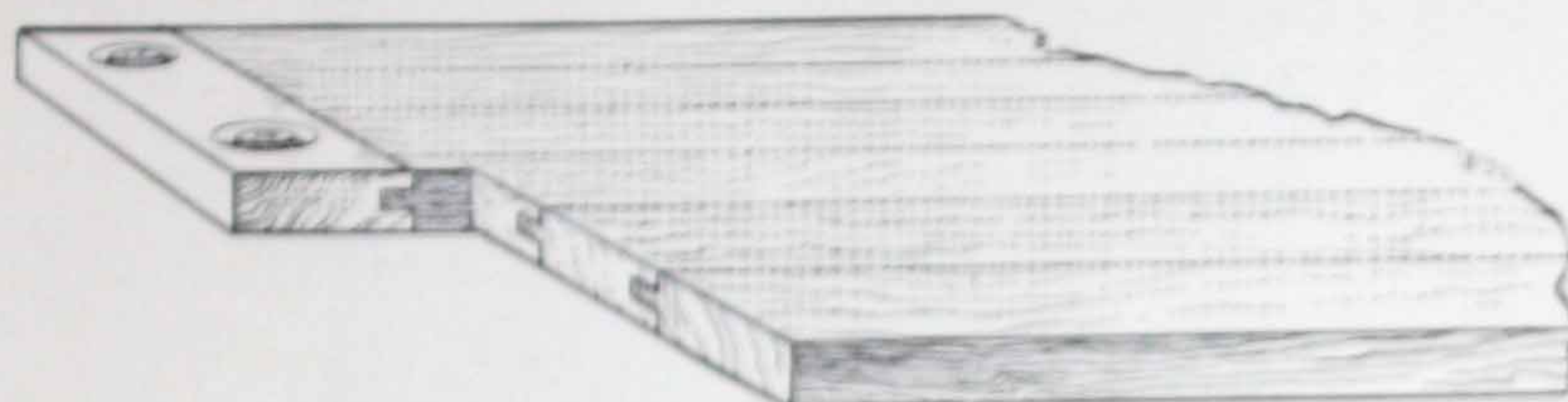


Illustration showing tongue and groove construction of drawing board with countersunk holding-down screws.

- | | | |
|-----------|--|------------------------------|
| No. 34F. | Drawing board with holding-down screws for paper and flange fitted with $\frac{3}{8}$ -18 standard thread for mounting on tripod, size 24x31 inches. | Code Word
DRAFTING |
| No. 34FF. | Same as No. 34F but size 18x24 inches. | DRAGON |
| No. 34H. | Same as No. 34F but size 15x15 inches. | DRAWN |

DRAWING BOARD CASES

- | | | |
|-----------|--|-----------------|
| No. 34J. | Canvas carrying case with leather corners for drawing board 24x31. | DREDGE |
| No. 34JJ. | Canvas carrying case with leather corners for drawing board 18x24. | DRIBLET |
| No. 34K. | Canvas carrying case with leather corners for drawing board 15x15. | DRIFTAGE |

PLUMBING ARM

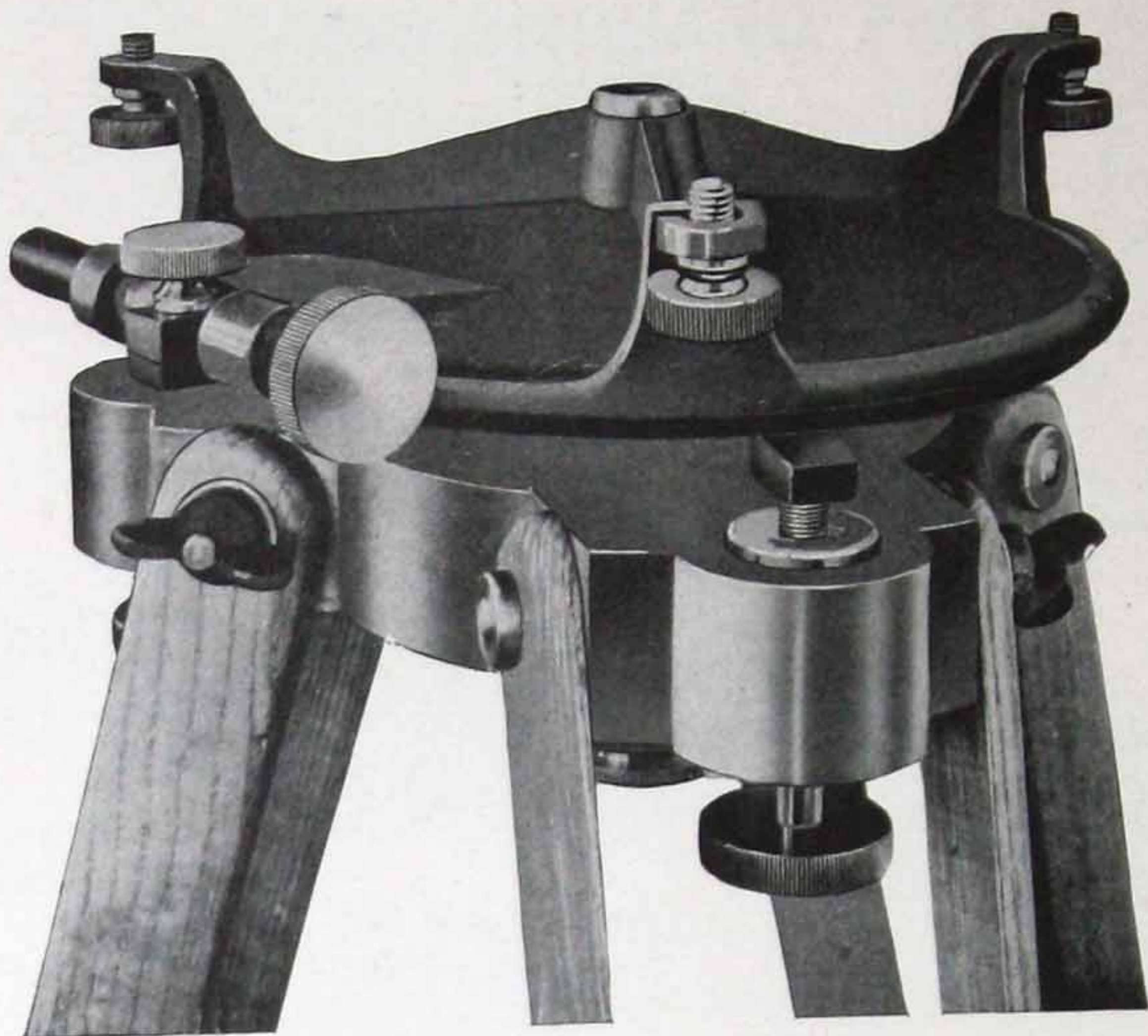
- | | | |
|----------|---------------------------|----------------|
| No. 34L. | Plumbing arm and plummet. | DROPPED |
|----------|---------------------------|----------------|

MOUNTED PAPER

- | | | |
|--|---|-----------------|
| No. 34M. | Fine quality drawing paper, white*, cream or green (specify color); size 24x31 inches, single mounted. | DRYAD |
| No. 34N. | Fine quality drawing paper, white*, cream or green (specify color); size 24x31 inches, double mounted, muslin between, can be used on both sides. | DRYDOCK |
| No. 34MM. | Single mounted drawing paper like No. 34M but size 18x24 or 15x15 (specify color). | DRYING |
| No. 34NN. | Double mounted drawing paper like No. 34N but size 18x24 or 15x15 (specify color). | DRYSALT |
| On special order we will supply drawing board size 22x22 and paper to fit at the same prices as size 18x24 (made to order only). | | DRYWARD |
| *White paper can be furnished with Eggshell surface. If desired, specify "EGGSHELL". | | EGGSHELL |

SEE PRICE LIST IN BACK OF CATALOG

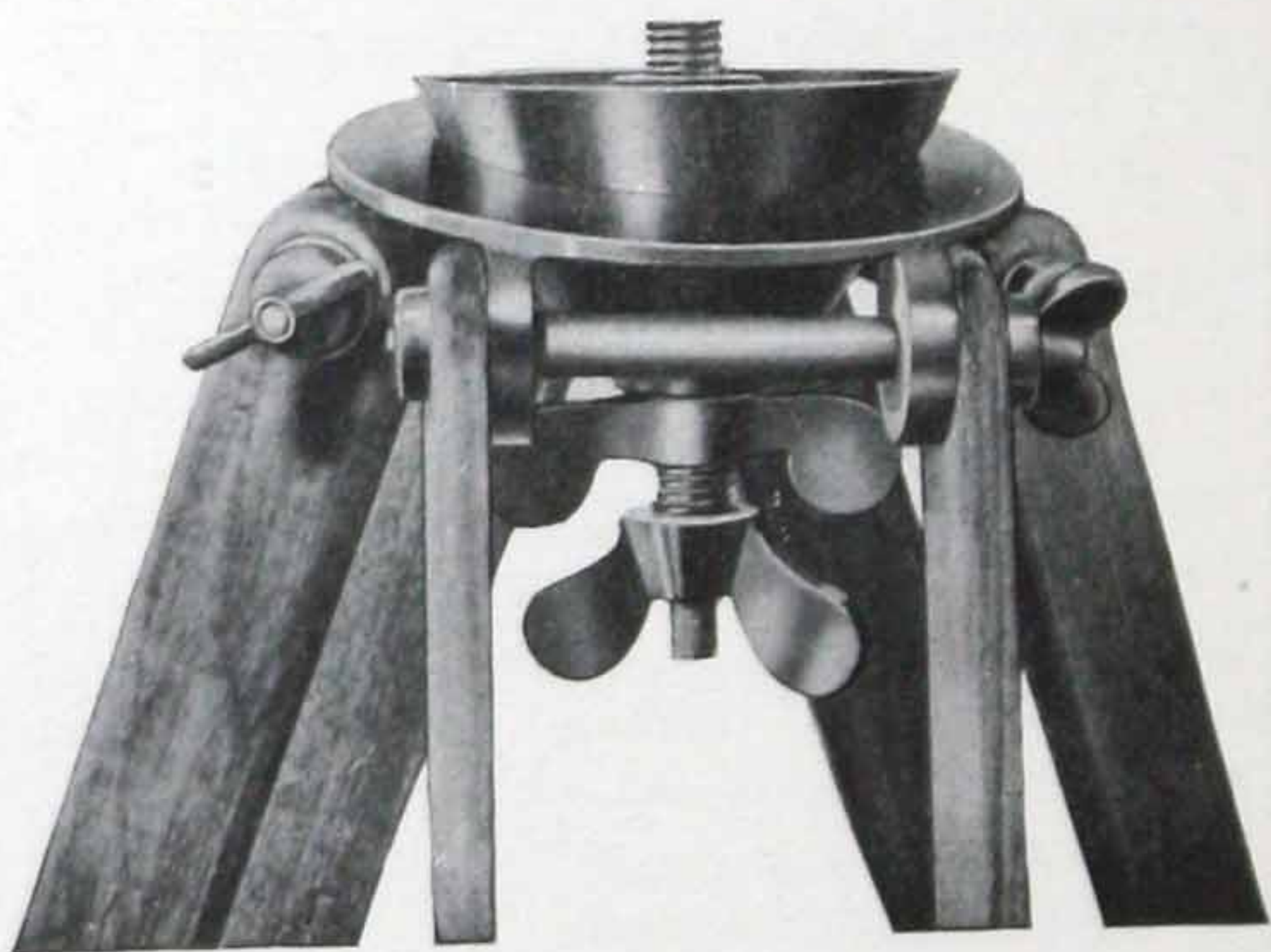
PLANE TABLE TRIPODS



No. 34B (Weight about 16 lbs.)

The Lietz Tangent Head is an improved form. Its nicety of adjustment and control of the drawing board is a labor-saving feature. It is constructed with three leveling screws and a clamp and tangent movement.

- No. 34B. Lietz tangent head tripod with straight legs.....
- No. 35A. Leather hood for tripod 34B.....
- Code Word
DEMOLISH
DUALA



No. 34C* (Weight about 11½ lbs.)

The Johnson Head consists of a ball and socket movement which permits of the orientation and quick leveling of the drawing board, and two wing nuts by means of which the board is securely clamped in position.

- No. 34C. Johnson head tripod with straight legs.....
- No. 34CE. Johnson head tripod with extension legs.....
- No. 35B. Leather hood for tripod 34C-34CE.....
- Code Word
DEMON
DENDROID
DUALIST

*Fitted with 5/8-18 standard thread.

LIETZ SPECIAL LIGHTWEIGHT JOHNSON PLANE TABLE MOVEMENT

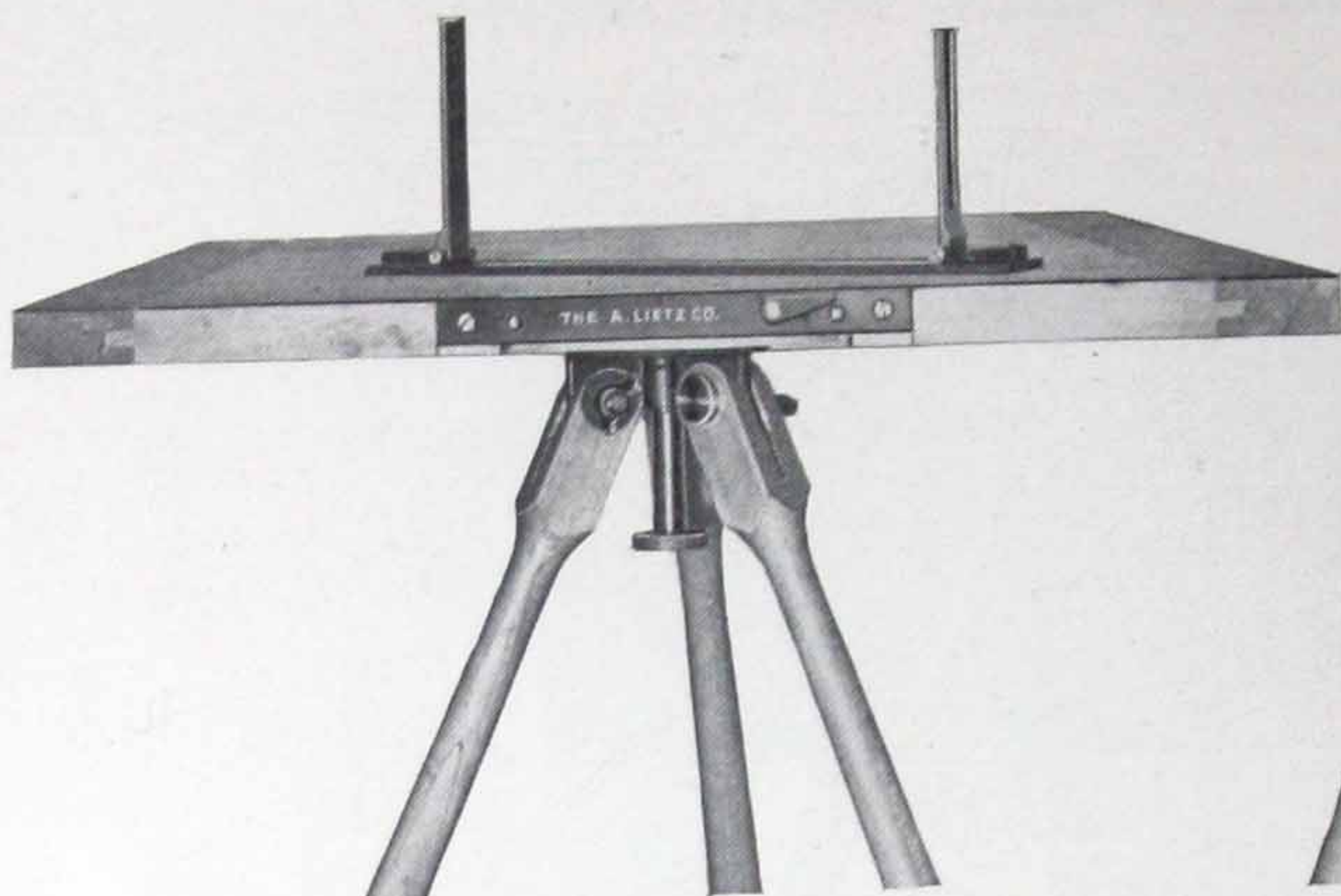
The Lietz special lightweight Johnson Head Tripod is especially designed to be used in connection with Lietz Geologists Alidades No. 31 and No. 33A.



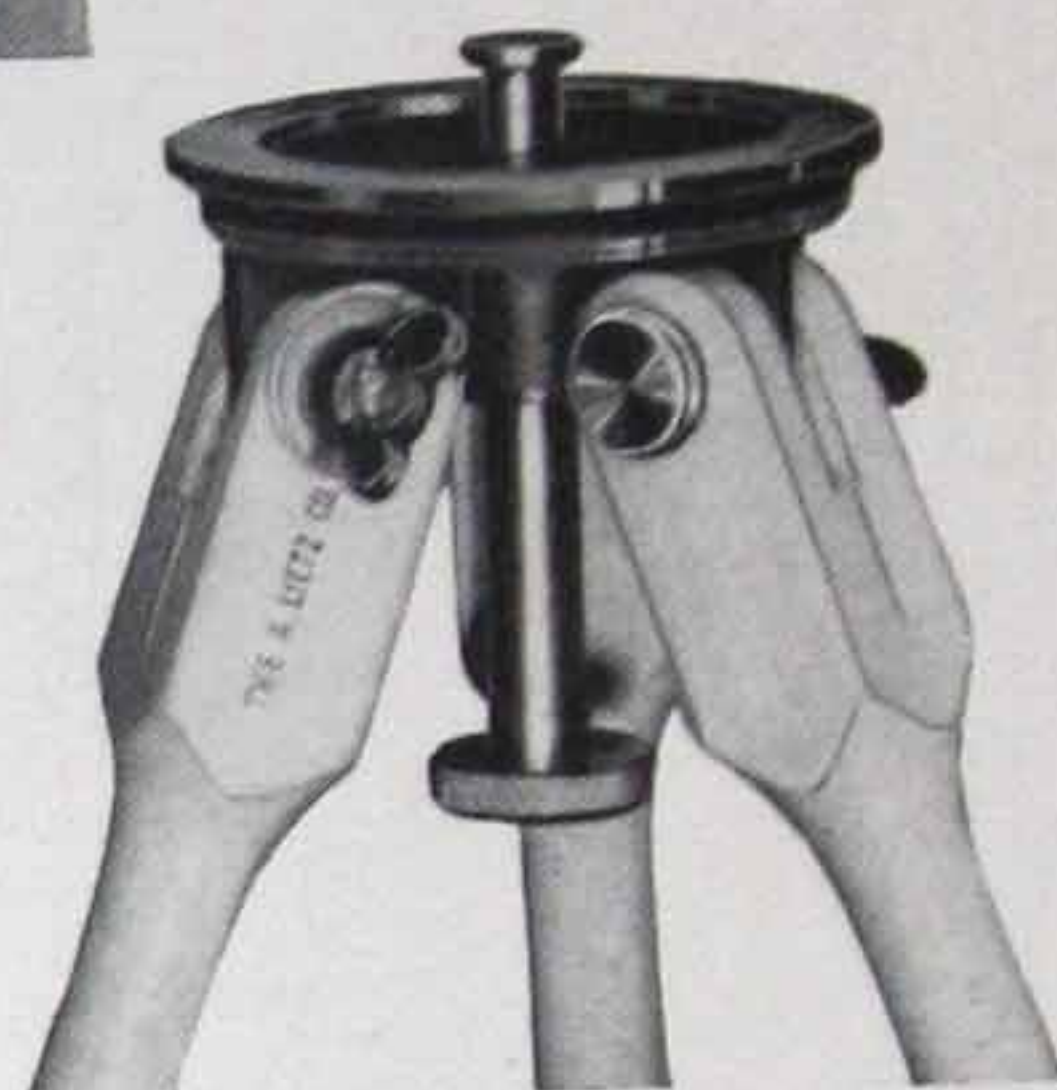
		Code Word
No. 34½CE.	Lietz Special Lightweight Johnson Head Tripod with extension legs fitted with ½-18 standard thread.	DENTARY
No. 34½CEG.	Canvas carrying case with leather ends for tripod No. 34½CE.	DERBY
No. 35C.	Leather hood for tripod No. 34½CE.	DUALIZE
Parts Susceptible to Loss or Injury		
No. 35D.	Wing nuts for Johnson head.	DUBLING
No. 35E.	Leveling screws for tangent head.	DUCAL
No. 35F.	Screws for attaching board to tangent head.	DUCKING
No. 35G.	Holding-down screw and socket for drawing board.	DUCTILE
No. 35H.	Holding-down screw only.	DUDEEN
No. 034C.	Extra straight leg for tripod (Johnson or tangent head).	DUENA
No. 039S.	Extra extension leg for tripod (Johnson head).	DUFFER
No. 034½.	Separate Lightweight Extension Leg for Johnson Head Tripod No. 34½CE.	DUFFAX

SEE PRICE LIST IN BACK OF CATALOG

LIETZ TRAVERSE TABLES



No. 37



No. 37-A

Lietz Traverse Table Outfits consist of a drawing board 15 x 15 inches which has on the under side a strong brass flange with spring. This flange engages with a plunger clamping screw which passes through the center of the tripod head. This connection firmly holds the board to the tripod when oriented to position. Trough compass with needle about 4 inches long fitted on one edge of drawing board.

Code Word

- No. 35½.**
Lietz Traverse Table **Alidade**
Brass, 10 inches long, durable black finish, one edge beveled and graduated 40 parts to the inch. Folding sights, in sewed leather case.....

CORMORANT
- No. 37A.**
Traverse Table **Tripod**
Consists of head and tripod with solid round legs without board.....

CORSAGE
- No. 37B.**
Traverse Table **Extension Tripod**
Consists of head and tripod with extension legs without board.....

CORSAGON
- No. 37C.**
Traverse Table **Drawing Board**
Best quality, selected pine, with strong brass flange with spring for attaching to tripod. Trough compass inserted in one edge; four holding down screws for paper.....

CORSAINT
- No. 37.**
Traverse Plane Table **Outfit Complete**
Consists of No. 35½ Alidade, No. 37A Tripod with solid round legs, No. 37C Drawing Board.....

CORRUGANT
- No. 37X.**
Traverse Plane Table **Outfit Complete**
Same as No. 37 but with tripod No. 37B with extension legs instead of tripod No. 37A.....

CORRONE

EXTRA TRIPOD LEGS

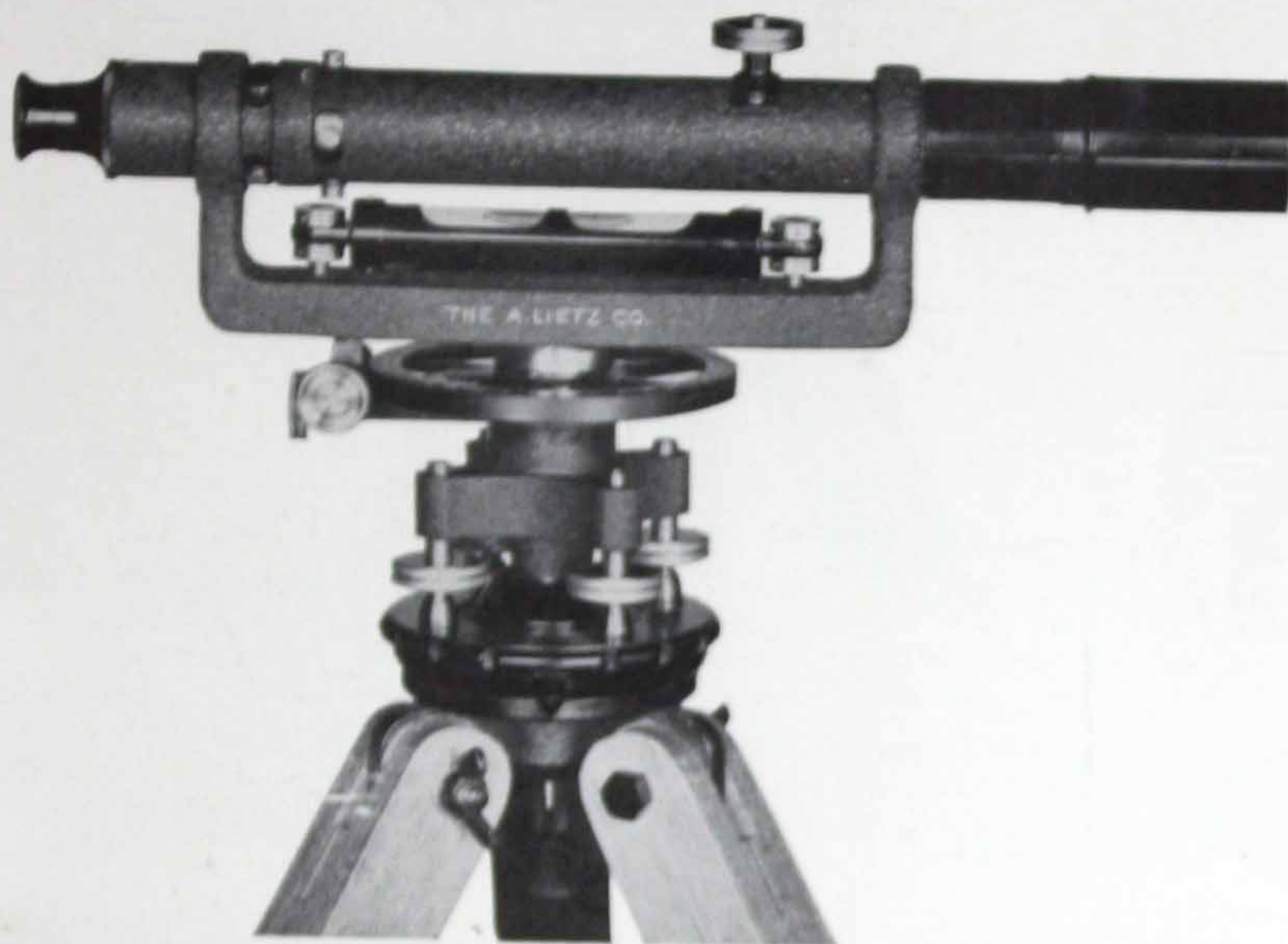
- No. 037A.**
Separate Solid Round Leg for Tripod No. 37A.....

CORSAIR
- No. 037B.**
Separate Extension Leg for Tripod No. 37B.....

CORSAITY

SEE PRICE LIST IN BACK OF CATALOG

AGRICULTURAL AND BUILDERS' LEVELS



No. 46C

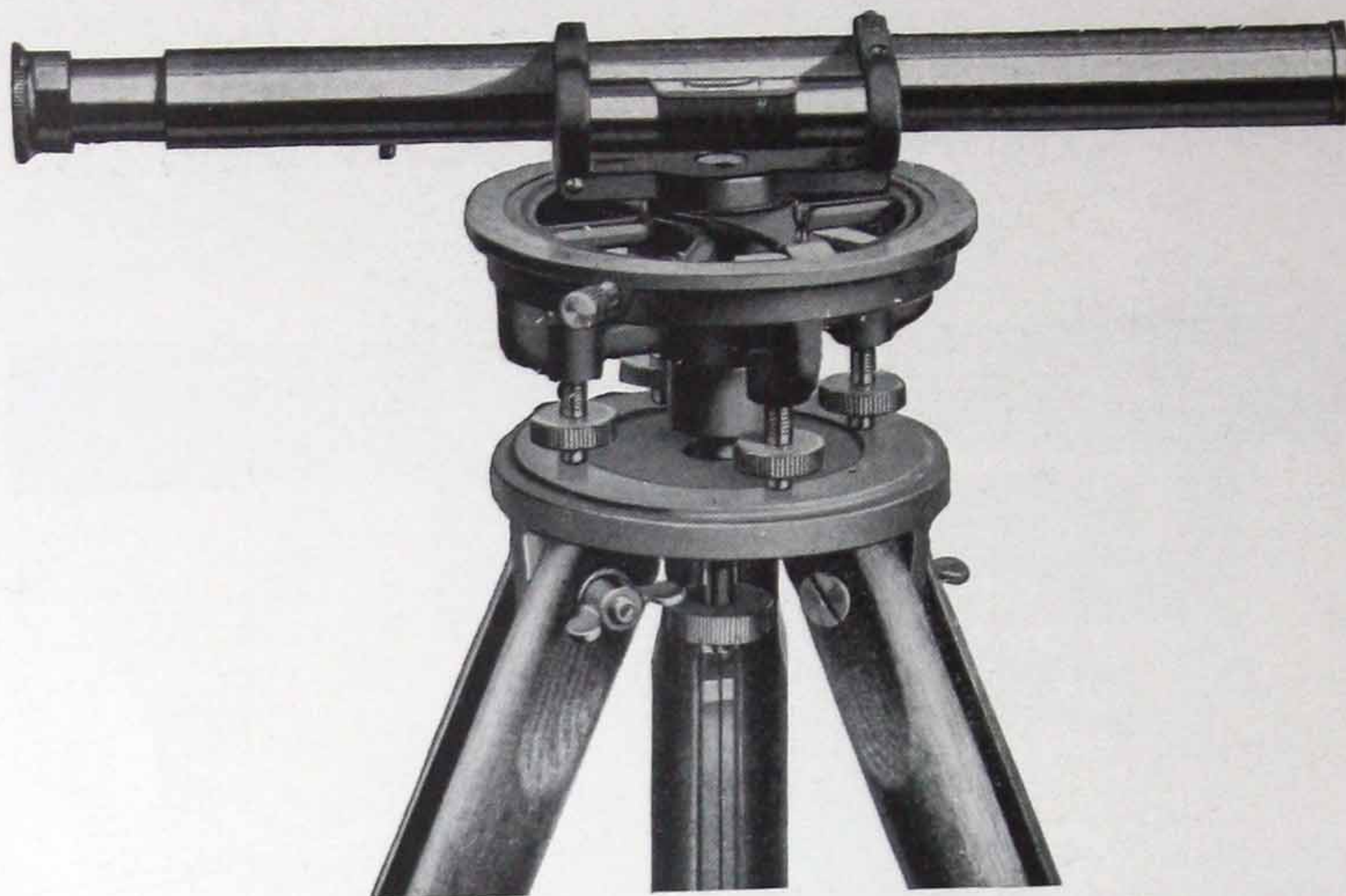
No. 46 Agricultural and Builders' Dumpy Level with 12" telescope, magnifying power 24X, with cross hairs, instrument equipped with hardwood tripod, complete in neat mahogany case with all usual accessories.

.....Code Word, **EBONIST**

No. 46-C Same as No. 46 but furnished with 4" horizontal circle with vernier reading to 5 minutes and clamp and tangent.....Code Word, **EBONITE**

SEE PRICE LIST IN BACK OF CATALOG

FARM AND DRAINAGE LEVELS



No. 47

These leveling outfits are very reliable and especially designed for use on the farm, for building construction, road building, landscape gardening and irrigation. Strong and durable, yet moderately priced. No expert or technical knowledge required to operate these instruments.

- No. 47** Farm Level with 10 in. telescope, magnifying power 10 diameters with cross hairs, ground and graduated spirit level $2\frac{1}{2}$ inches long. Horizontal circle $4\frac{1}{2}$ inches in diameter, graduated in degrees and numbered in quadrants with index pointer for setting to zero from any position. Reinforced bronze base with 4 leveling screws and shifting center. Instrument complete with hinge leg tripod, polished wooden box and plumb bob.
.....Code Word, **EBWING**



No. 432

WOODEN LEVELING ROD AND TARGET

For Use with Farm and Builders' Levels

Made of seasoned stock in two 4-foot sections, total height 8 feet.

- No. 432.** Wooden Leveling Rod and Target, divided in foot, inches and quarter-inches. The foot figures in red, the inches in black.....Code Word, **ECHABLE**

SEE PRICE LIST IN BACK OF CATALOG

CONVERTIBLE BUILDERS' LEVEL



No. 48

No. 48. Convertible Builders' Level with 12-inch telescope, magnifying power 24 diameters with cross hairs; 4-inch horizontal circle with vernier reading to 5 minutes. Instrument equipped with hardwood tripod. Complete with metal trivet plate, plumb bob, sunshade, adjusting pins and all usual accessories, in neat mahogany finished case.

..... Code Word, **EBYING**

No. 48S. Same as No. 48 but with shifting center.

..... Code Word, **EBYLASH**



(Shipping weight about 45 lbs.)

For vertical sighting the telescope is simply lifted out of the wyes, placed into the standards on cross bar and two clips pressed over the axis.

SEE PRICE LIST IN BACK OF CATALOG

TRIPODS FOR LIETZ INSTRUMENTS



Made of selected straight-grained hardwood, well seasoned. Tripod heads are cast of our bell metal and fitted with aluminum protection caps. New style bolts with keeper screws, prevent entirely the loss of the wing nuts.

Our split-leg tripods are so designed and constructed as to secure the greatest amount of steadiness and strength with the least amount of weight. We can furnish these tripods with one extension leg. This admits of all the advantages of the extension tripod as regards set-ups, with, of course, the disadvantage of being less portable.

Our Extension Tripods are very rigid and strong. The double clamps employed act quickly and firmly. They are made of special drawn hard metal and will not break or bend under ordinary use.

TRIPODS

All Tripods for Lietz Engineers' Transits and Levels have a tripod head with threads $3\frac{1}{2}$ " in diameter, 8 threads to the inch.

		Code Word
No. 38S.	Standard Split Leg Tripod for Transits Nos. 2 to 6 and Levels Nos. 19 and 20T.....	EAGLET
No. 38G.	Extra Long Split Leg Tripod for Geodetic Level No. 19G. Legs 61 inches long.....	EAGLOW
No. 38L.	Lightweight Split Leg Tripod for Transits Nos. 8 and 12.....	EARING
No. 39S.	Standard Extension Tripod for Transits Nos. 2 to 6 and Levels Nos. 19 and 20T.....	EARLDOM
No. 39L.	Lightweight Extension Tripod for Transits Nos. 8 and 12.....	EARTHY

FOR BUILDERS' LEVELS

(Do not have $3\frac{1}{2}$ "x8 threads)

No. 40.	Hardwood Round Leg Tripod for Builders' Levels Nos. 46 and 48.....	EARTON
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EXTRA TRIPOD LEGS AND PARTS

No. 038S.	Separate Standard Split-leg for Tripod No. 38S.....	EAGLONE
No. 038L.	Separate Lightweight Split-leg for Tripod No. 38L.....	EARONG
No. 039S.	Separate Standard Extension Leg for Tripod No. 39S.....	EARLONE
No. 039A.	Round center portion only for Extension leg No. 039S.....	EAHAD
No. 039B.	One side or shell only for Extension leg No. 039S.....	EAHAFI
No. 039C.	Extra Clamp complete with thumb screw for No. 039S.....	EAHAG
No. 039D.	Inner Ring for Extension leg No. 039S.....	EAHAIL
No. 039L.	Separate Lightweight Extension leg for Tripod No. 39L.....	EARTONE
No. 039M.	Round center portion only for Extension leg No. 039L.....	EAKAW
No. 039P.	One side or shell only for Extension leg No. 039L.....	EALER
No. 039Q.	Extra Clamp complete with thumbscrew for No. 039L.....	EALIFE
No. 039R.	Inner Ring for Extension leg No. 039L.....	EALONG
No. 040.	Separate Round Tripod Leg for Tripod No. 40.....	EARTOWN
No. 042G.	Extra Tripod shoe with spur.....	EANAN
No. 042H.	Extra Tripod shoe without spur.....	EANIST

TRIPOD HEAD

No. 43S.	Tripod Head complete for Standard Tripods No. 38S and 39S, including bolts, nuts and washers, but without Tripod cap.....	EARAD
No. 43L.	Tripod Head complete, same as No. 43S but for Lightweight Tripods No. 38L and 39L.....	EARALL
No. 043A.	Cast Aluminum cap for tripod.....	EARANE
No. 043B.	Extra Bolt with wing nut and washer for 38S and 39S.....	EARAST
No. 043C.	Extra Bolt with wing nut and washer for 38L and 39L.....	EARATE
No. 044C.	Extra Wing nut and washer only for bolt.....	EARAWN

CARRYING CASES FOR TRIPODS

Made of Heavy Canvas with Leather Ends and Shoulder Strap.

No. 44A.	Carrying Case for Split-leg Tripods.....	EARWAX
No. 44B.	Carrying Case for Extension Tripods.....	EARWIG

SEE PRICE LIST IN BACK OF CATALOG

RHODES REDUCING ARC

Patent Pending

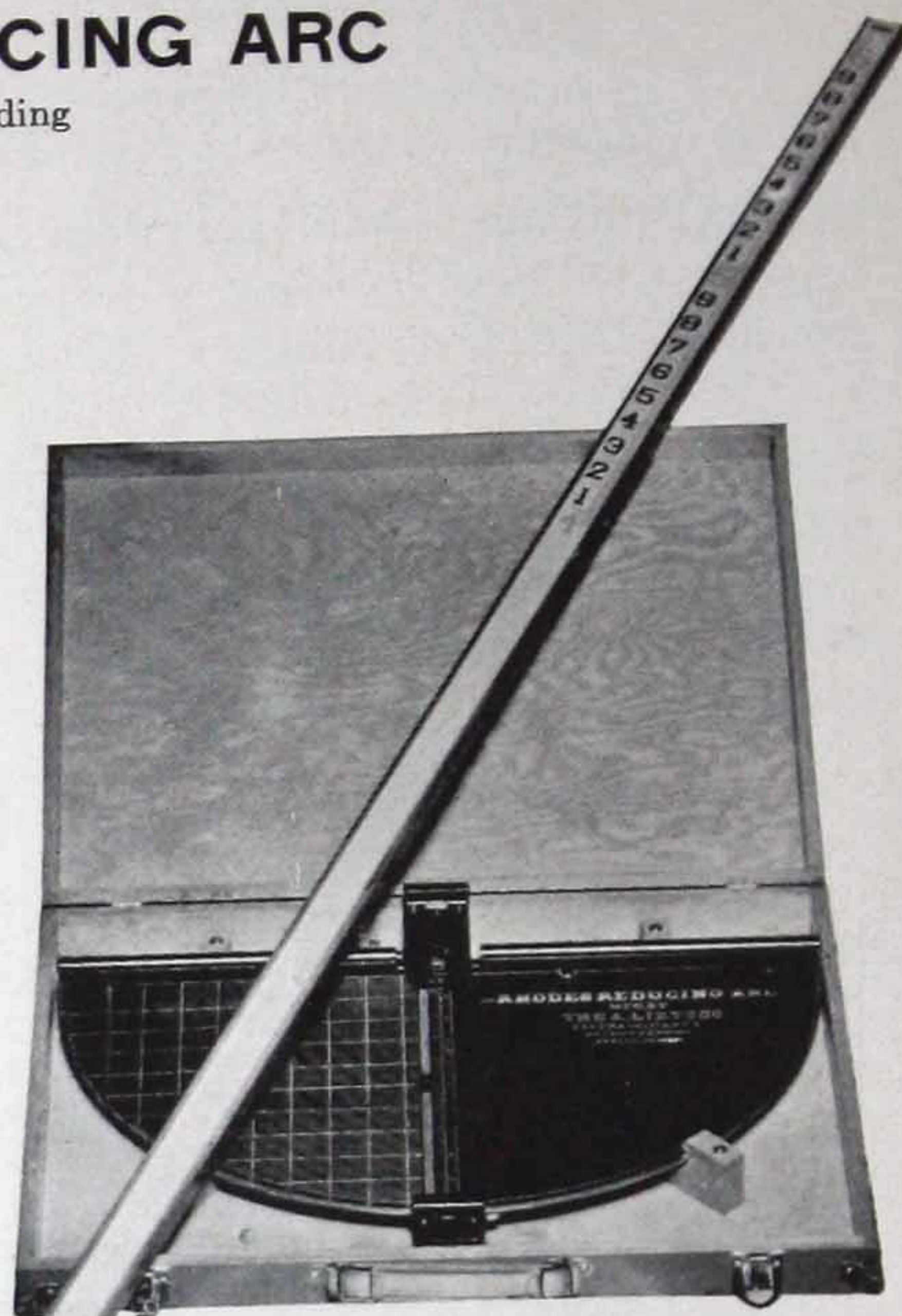
The Rhodes Reducing Arc consists of a simple arrangement of scales on a staff or rod, combined in such a manner that distances, vertically and horizontally, to a point are readily obtained graphically when the slope distance is found by measurement.

Horizontal and vertical distances, representing the base and altitude of a right-angled triangle, are read from scales founded on a movable arc revolving about a center of definite height. The slope distance, which is the hypotenuse, is found on the fixed vertical scale. Revolving the arc and sighting the point on which the elevation is desired determines the vertical angle.

The device can be used equally well for original or final cross-sections, setting slope stakes, reference points from center line, or re-establishing the center line from reference points. A three-man party can efficiently handle the work in mountainous and rugged country.

The instrument replaces the transit in the method of taking cross-sections by slope angles and slope measurements. Weighing less than seven pounds, it has the advantage of being lighter and more portable; it can be instantly set up. The

device eliminates troublesome manipulations and determines elevation and horizontal distances without mathematical calculations, thus reducing possibilities of error.



No. 50

Instrument Complete in
Box with Rod

GREAT TIME SAVER

It is estimated by those who have used it that the work of taking original cross-sections in rough country can be accomplished in one-half the time required by other accurate methods.

The use of the reducing arc in a few weeks will pay its entire purchase price and reduce the cost of cross-sectioning nearly 50 per cent.

No. 50. Rhodes Reducing Arc complete in box with rod and book of instructions.
..... Code Word, **ECARO**

A special booklet fully describing the Rhodes Reducing Arc will be sent on application.

SEE PRICE LIST IN BACK OF CATALOG

Paul. Pringleton says bought all from Healy
of London

MODERN ENGINEERS' AND
SURVEYORS' INSTRUMENTS

THE A. LIETZ COMPANY

SAN FRANCISCO, U. S. A.

SEXTANTS



- No. 55. High-grade Sextant. $6\frac{1}{2}$ inch radius, one-piece frame, crystalline finish. Graduated on solid silver to 130 degrees of arc reading to 10 seconds. Full-size horizon mirror, red and green shades, patent **rapid reader micrometer tangent**, hardwood polished handle. Telescopes consist of high power erecting achromatic star, blank sight tube, 1 eye shade. Instrument complete with certificate in hardwood polished case with handle.

..... Code Word, **EDGETOOL**

- No. 56. Sextant, $6\frac{1}{2}$ inch radius with spring tangent screw, star, inverting and blank telescopes with certificate complete in case. Code Word, **EDGYRE**

BUBBLE ATTACHMENT

- No. 57. Artificial Horizon (Bubble type) attached to any Sextant (old or new).

..... Code Word, **NAUART**

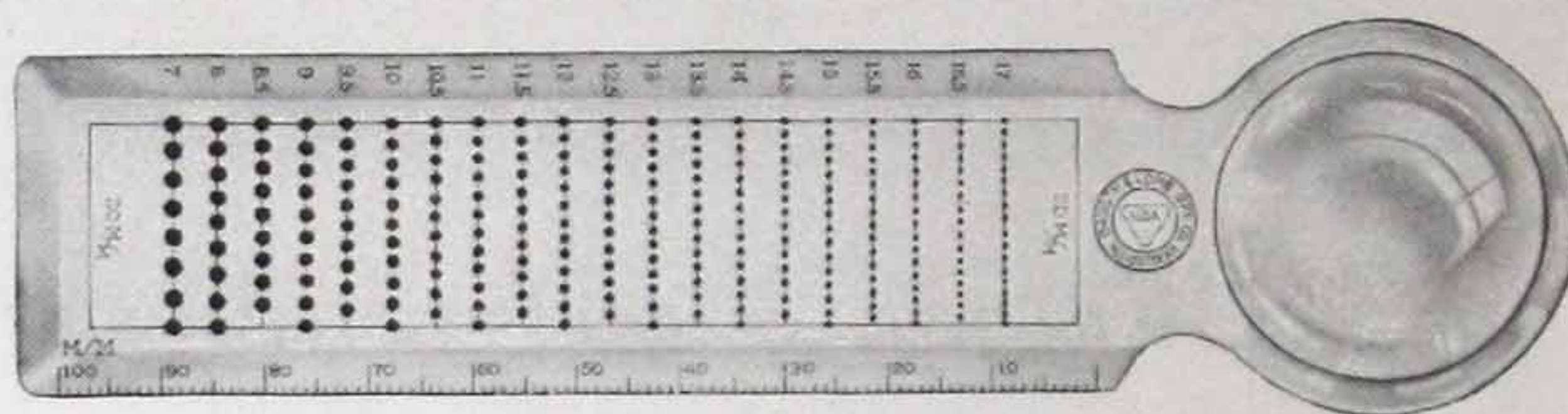
We are prepared to furnish Precision bubble sextants for Marine and Air navigation. Write for prices and information.

SEE PRICE LIST IN BACK OF CATALOG

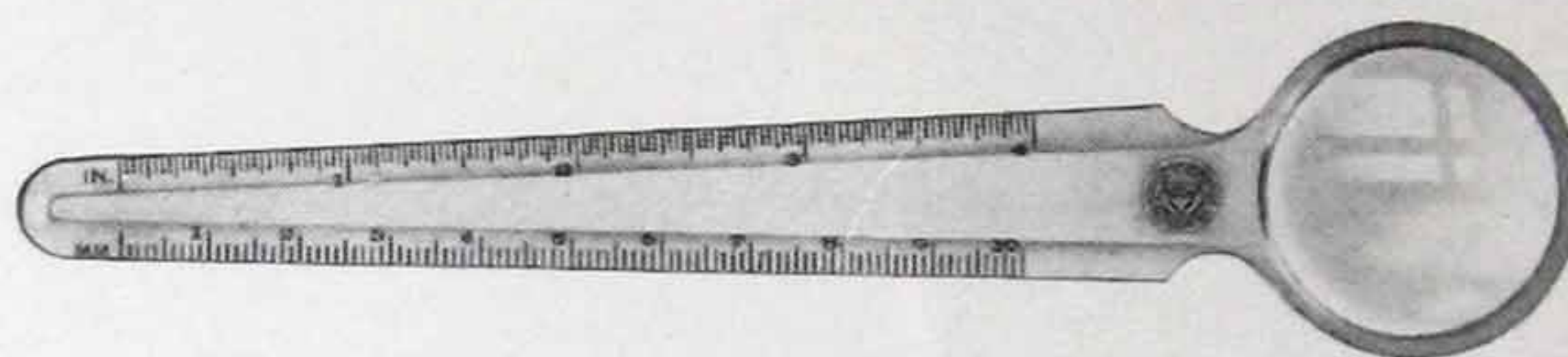
MAGNIFIERS, READING GLASSES AND MICROSCOPES



No. 65



No. 66



No. 68

- | | | |
|---------|--|---------------|
| | | Code Word |
| No. 65. | Vest Pocket octagon Magnifier with handle. Lens 1 inch in diameter, handle 1½ inches long. Magnification 4X. . . | EDGO |
| No. 66. | Stamp Collectors' Magnifier with perforation gauge and millimeter scale. | EDIA |
| No. 68. | Magnarule, combination Magnifier, letter opener and 4-inch ruler with inch and metric divisions. | EDIACK |

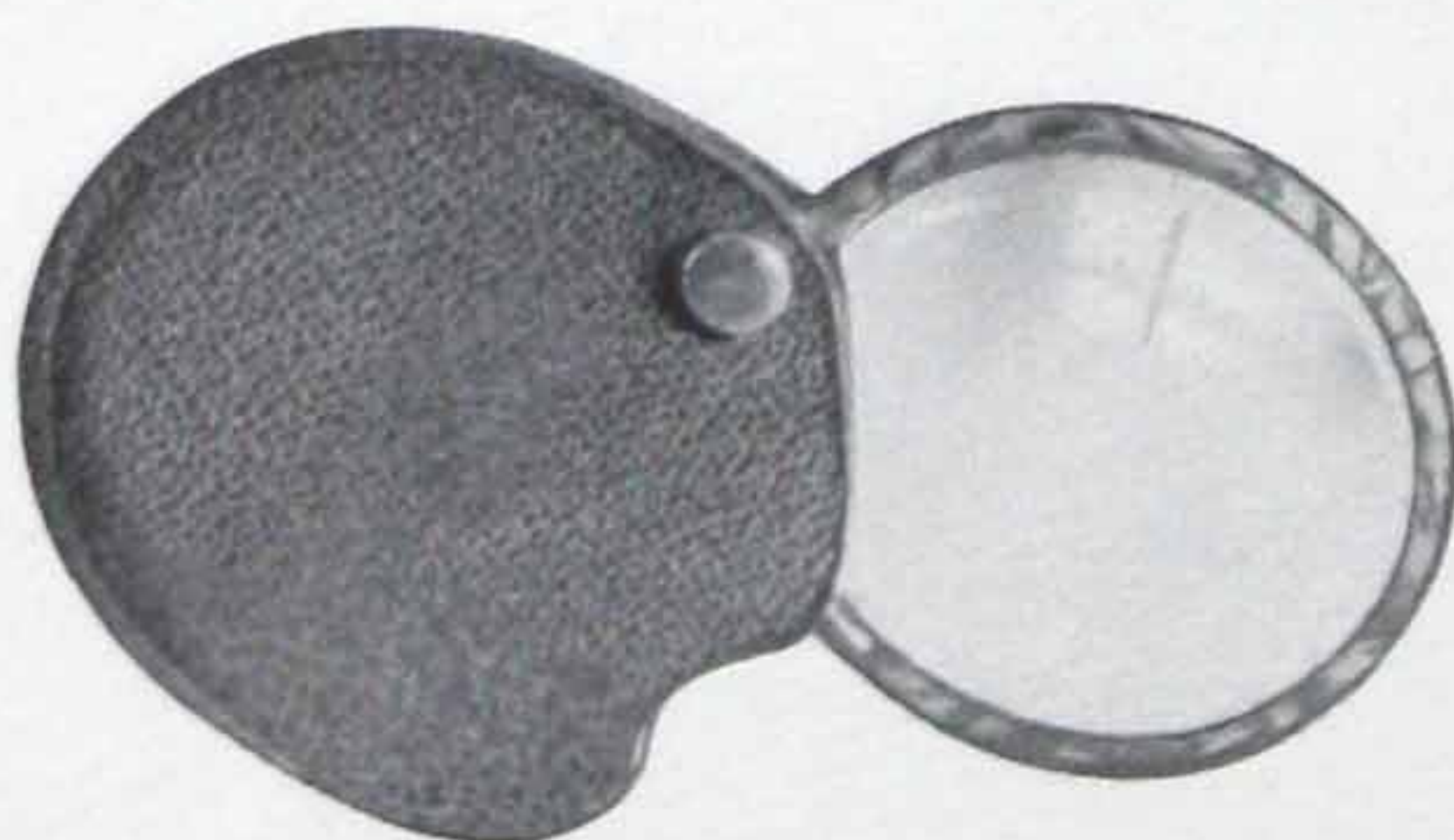
GIANT POCKET MICROSCOPE

Magnifies 40-50-60 Times

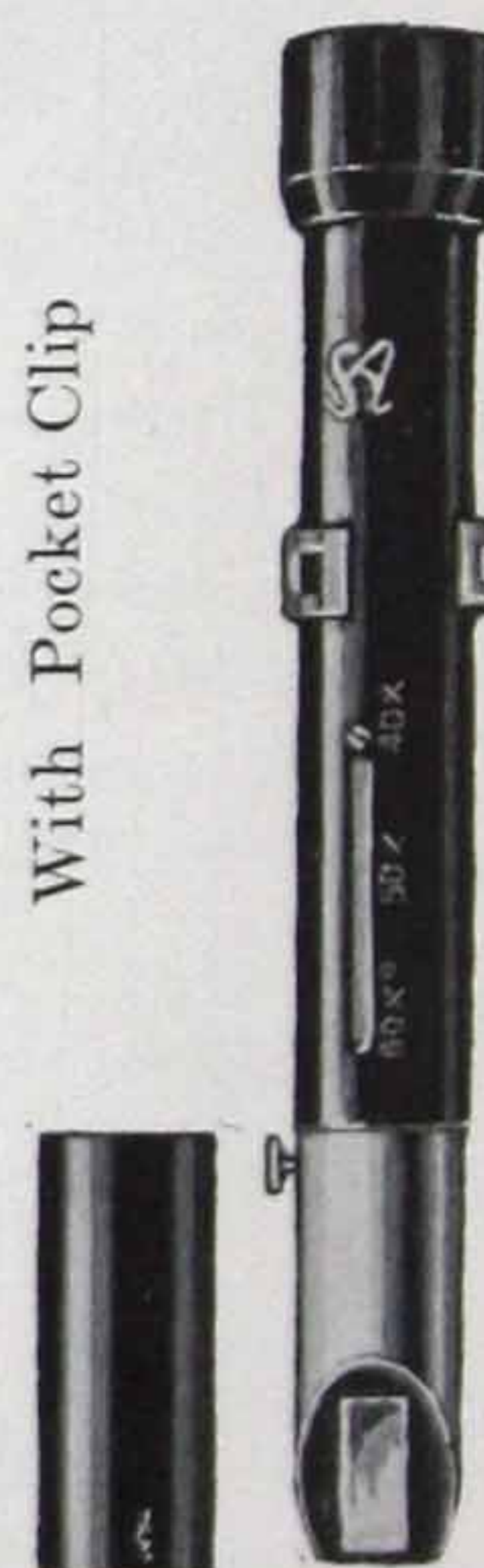
Practical for home, school, office and factory.

For minute examination of paint surfaces, textiles, metals, plants and insects.

- No. 67. Giant Pocket Microscope, with pocket clip, dust cap and mirror. Magnification 40-50-60 times.
Code Word, **ECHO**



No. 69



No. 67

- No. 69. Pocket Magnifier with swinging leather case cover, lens 2" in diameter.**EDITING**

SEE PRICE LIST IN BACK OF CATALOG

POCKET MAGNIFYING GLASSES



No. 70A



No. 71

Hard Rubber Mounting

No. 70.	1-inch Single Lens, hard rubber, oval, magnification 4.0X.....	Code Word
No. 70A.	1 1/4-inch Single Lens, hard rubber, oval, magnification 3.5X.....	EDIBLE
No. 70B.	1 1/2-inch Single Lens, hard rubber, oval, magnification 3.0X.....	EDIN
No. 71.	1 1/4-inch Double Lens, hard rubber, oval, magnification 3.5-7X.....	EDIFY
		EDIT

Metal Mounting

No. 75.	1-inch Single Lens, metal mounting, bellows shape, magnification 3.5X.....	EDITOR
No. 76.	1-inch Double Lens, metal mounting, bellows shape, magnification 3-6X.....	EDITORIAL

CODDINGTON MAGNIFIERS



Give a good definition and a wide field. They are made of a single piece of glass of cylindrical shape with a deep groove cut in the center and blackened to act as a diaphragm. The ends of the cylindrical shaped glass are ground and polished to form lens surfaces.

No. 79C-7	Coddington Lens, Magnification 7X.....	Code Word
No. 79C-10	Coddington Lens, Magnification 10X.....	EDOB
No. 79C-14	Coddington Lens, Magnification 14X.....	EDOBIM
No. 79C-20	Coddington Lens, Magnification 20X.....	EDOBOT

HASTINGS APLANATIC TRIplet MAGNIFIERS

The most perfect magnifiers produced, having a very large angle of view and the high order of correction always appreciated by technical workers in every field.



No. 79H-7	Hastings Aplanatic Triplet, Magnification 7X.....	Code Word
No. 79H-10	Hastings Aplanatic Triplet, Magnification 10X.....	EDOG
No. 79H-14	Hastings Aplanatic Triplet, Magnification 14X.....	EDOGAR
No. 79H-20	Hastings Aplanatic Triplet, Magnification 20X.....	EDOGEL
		EDOGERT

SEE PRICE LIST IN BACK OF CATALOG

THREAD COUNTERS AND TRIPOD MAGNIFIER



No. 81



No. 84

- | | | | |
|---------|--|-----------|--------------|
| No. 81. | Thread Counter, brass frame, 1/2-inch field..... | Code Word | EDONA |
| No. 83. | Thread Counter, brass frame, nickel plated, 1-inch field.. | | EDOON |
| No. 84. | Magnifier on three legs, brass, screw adjustment, 1-inch diameter, magnification 7.5X..... | | EDOX |

MAGNIFYING OR READING GLASSES

Reading Glasses Nos. 85 to 91 are of the best quality material and workmanship. The lenses are double convex, accurately ground from clear white glass and highly polished, mounted in German silver rim, with ebonized handle.



Nos. 85-91

- | | Code Word | | Code Word |
|------------------------------------|-------------|-----------------------------------|--------------|
| No. 85. 2 inches diameter..... | EDA | No. 89. 4 inches diameter.... | EDALE |
| No. 86. 2 1/2 inches diameter..... | EDAC | No. 90. 4 1/2 inches diameter.... | EDAM |
| No. 87. 3 inches diameter..... | EDAD | No. 91. 5 inches diameter.... | EDAPH |
| No. 88. 3 1/2 inches diameter..... | EDAG | | |



No. 92

READING GLASS WITH ADJUSTABLE HANDLE AND STAND

Accurately ground lens of clear, white glass. Nickel plated Goose-neck handle, and metal base, nicely finished.

- No. 92. Reading glass with 3" lens.
.....Code Word, **EDAQUE**

SEE PRICE LIST IN BACK OF CATALOG

DIMINISHING OR REDUCING GLASSES

Reducing Glasses consist of double concaved lenses. Used by artists, engravers, etc., to reduce, optically, drawings, photographs and other illustrations.



Nos. 104-106

- | | Code Word |
|---|-----------|
| No. 101. Reducing Glasses, round, ground edges, unmounted, 2 inches in diameter..... | EDAR |
| No. 104. Reducing Glasses, in German silver rim with ebonized handle, 2 inches in diameter..... | EDASH |
| No. 105. Reducing Glasses, like No. 104, but 3 inches in diameter..... | EDASO |
| No. 106. Reducing Glasses, like No. 104, but 4 inches in diameter..... | EDATE |

EASYREAD MAGNIFYING GLASSES



No. 109

A new line of Reading Glasses. Nickel mountings. Always in focus.

- | | Code Word |
|---|-----------|
| No. 109. Reading Glass, 4x1 $\frac{5}{8}$ inches, folding, in leather case..... | EDECK |
| No. 110A. Reading Glass, 5x2 $\frac{1}{4}$ inches, not folding..... | EDEL |
| No. 110B. Reading Glass, 7x2 $\frac{1}{4}$ inches, not folding..... | EDEN |



No. 117

ANGLE PRISM

- No. 117. Rectangular Prism, for angles of 90 degrees. Size of instrument 2 $\frac{1}{2}$ x1 $\frac{1}{4}$ x $\frac{5}{8}$ inches, in morocco case.

.....Code Word, **EDUCATION**

SEE PRICE LIST IN BACK OF CATALOG

TALLY REGISTERS



No. 126A

Hand Tally Registers Nos. 126A-126B for keeping count by pressing on a knob, are of first-class workmanship and will not get out of order. The cases are nickel-plated and they are arranged with a zero-setting device.

- | | |
|--|----------------|
| | Code Word |
| No. 126A. Hand Tally Register, capacity 1 to 1,000..... | EFANNER |
| No. 126B. Hand Tally Register, capacity 1 to 10,000..... | EFARE |

CELLULOID FIELD BOOKS OR CRUISERS' PADS

As used by woodsmen for tallying timber.

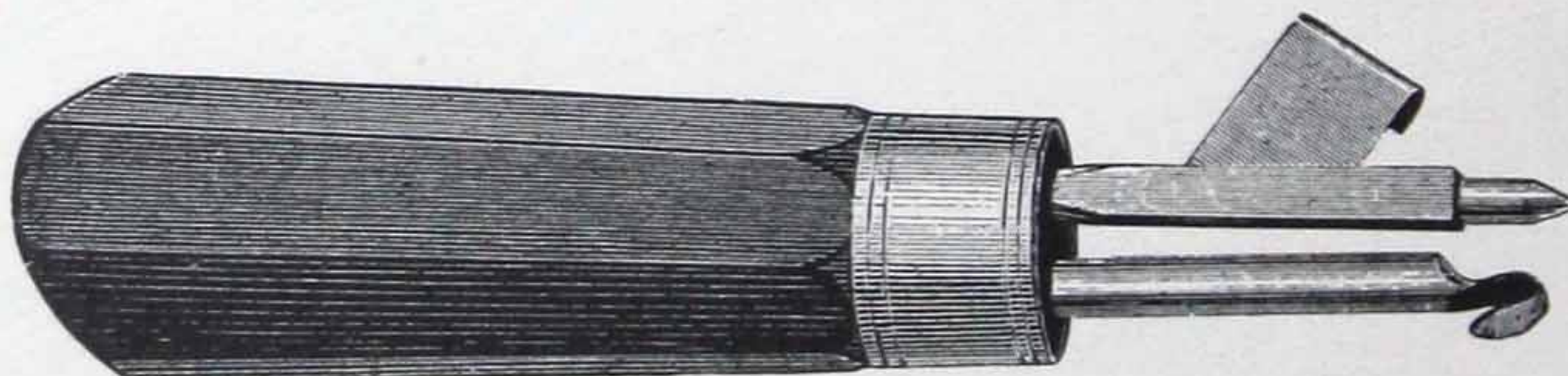


No. 129

Cruisers' Pads contain six sheets of heavy white, opaque celluloid, dull finish, with strong leather covers. Will take pencil and erasures instantly. Not affected by rain.

- | | |
|---|--------------|
| | Code Word |
| No. 129. Cruisers' Pad, 4x6 inches..... | EFAUN |

TIMBER SCRIBES

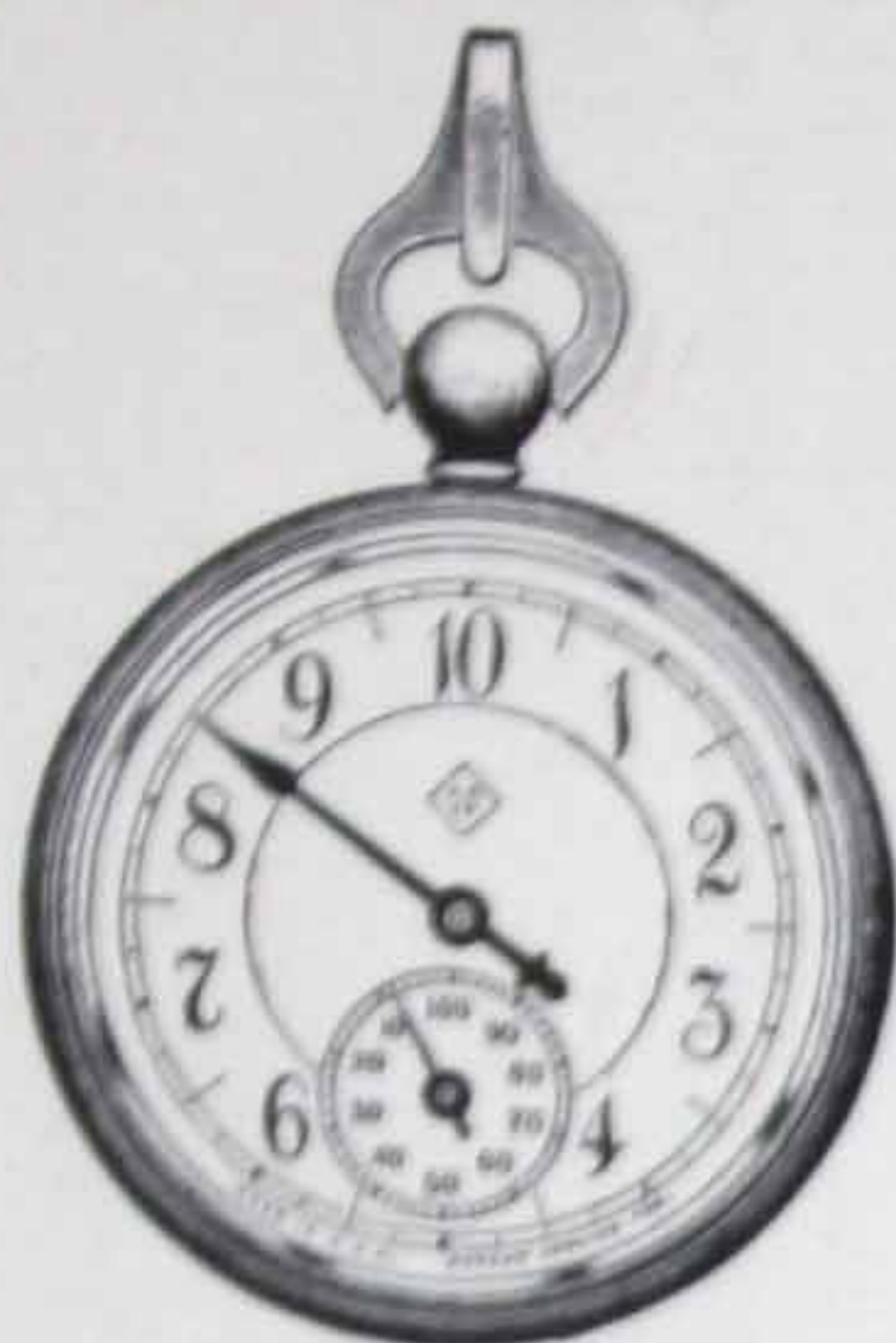


No. 130

- | | |
|--|-------------|
| | Code Word |
| No. 130. Timber Scribe, wooden handle (size 6½ inches) | EFAW |

SEE PRICE LIST IN BACK OF CATALOG

PEDOMETERS AND PASSOMETERS



No. 132A



No. 136

- No. 132A. Pedometer, registers distance walked up to 100 miles by each one-quarter mile.

Code Word

EFELT

The hands on above can be set backward or forward as desired by removing back of case and turning set screw.

- No. 135. Pedometer, registers distance walked up to 100 miles by each one-quarter mile, with resetting device.

EFELON

- No. 136. Passometer, or step-counter, registers to 100,000 steps with stem resetting device.

EFEMOR

MINERS' COMPASS OR DIPPING NEEDLE



No. 137

Code Word

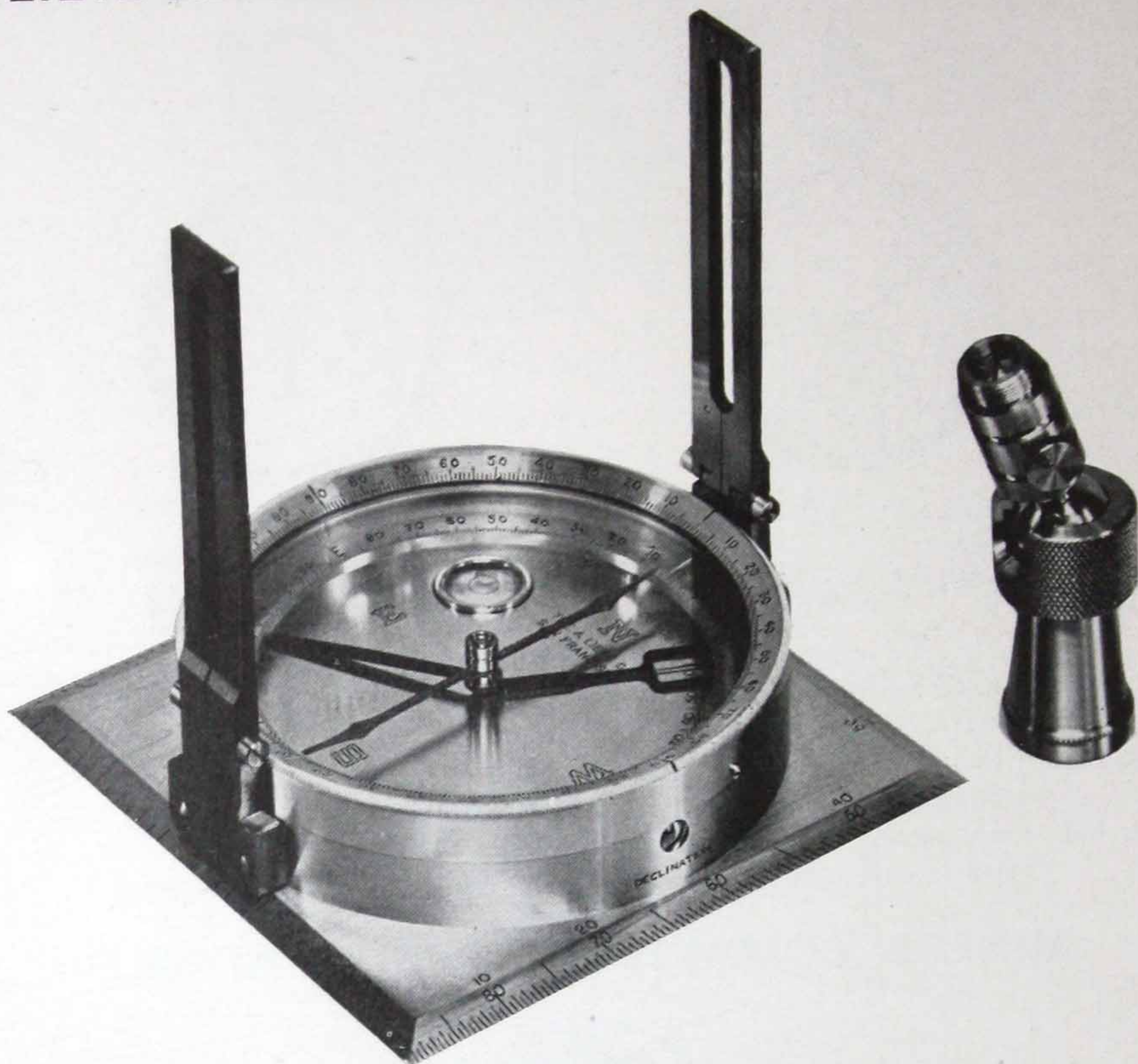
- No. 137. Dipping Needle, Norwegian pattern, needle gimbaled, in velvet-lined case.

EFFLUX

This instrument is a serviceable guide to the discovery and location of magnetic iron ore. The magnetic needle is carefully balanced in a gimbal frame. It must be held so suspended that the needle is in the plane of the magnetic meridian. After releasing the stop the needle will swing freely. This instrument can be used for locating pipe lines and iron inspection covers which may be covered out of sight. It will not, however, indicate the presence of gold or silver.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ GEOLOGICAL AND FORESTRY COMPASS



No. 139.

Lietz Geological and Forestry Compass. Aluminum case, square base $4\frac{1}{2} \times 4\frac{1}{2}$ in. with folding sights. Raised compass ring graduated to degrees with variation. Compass needle 3 in. long, jeweled center with stop. Beveled ring on compass box graduated to degrees and numbered in quadrants, with sighting marks at each quadrant and a knurled edge for revolving in azimuth. Pendulum clinometer graduated to degrees, 90 degrees in each direction. Beveled edges of base graduated, two edges as a protractor, one edge to inches and eighths, representing chains on scale of 1 in. to one mile, the other edge graduated to inches and tenths. Circular spirit level inside compass box. Instrument complete with ball and socket joint for mounting on tripod or Jacob staff, in sewed leather case with shoulder strap

Code Word

EFFABEL

Extra Parts for Surveying Compasses

No. 144A.
No. 144C.

Leather Case with shoulder strap
Ball and Socket for surveying compass

EFFIMA
EFFITY

JACOB'S STAFF AND TRIPOD FOR COMPASSES

Code Word

No. 146.
No. 148.

Jacob's Staff, 5 feet, iron shoe
Tripod with brass staff top for compasses

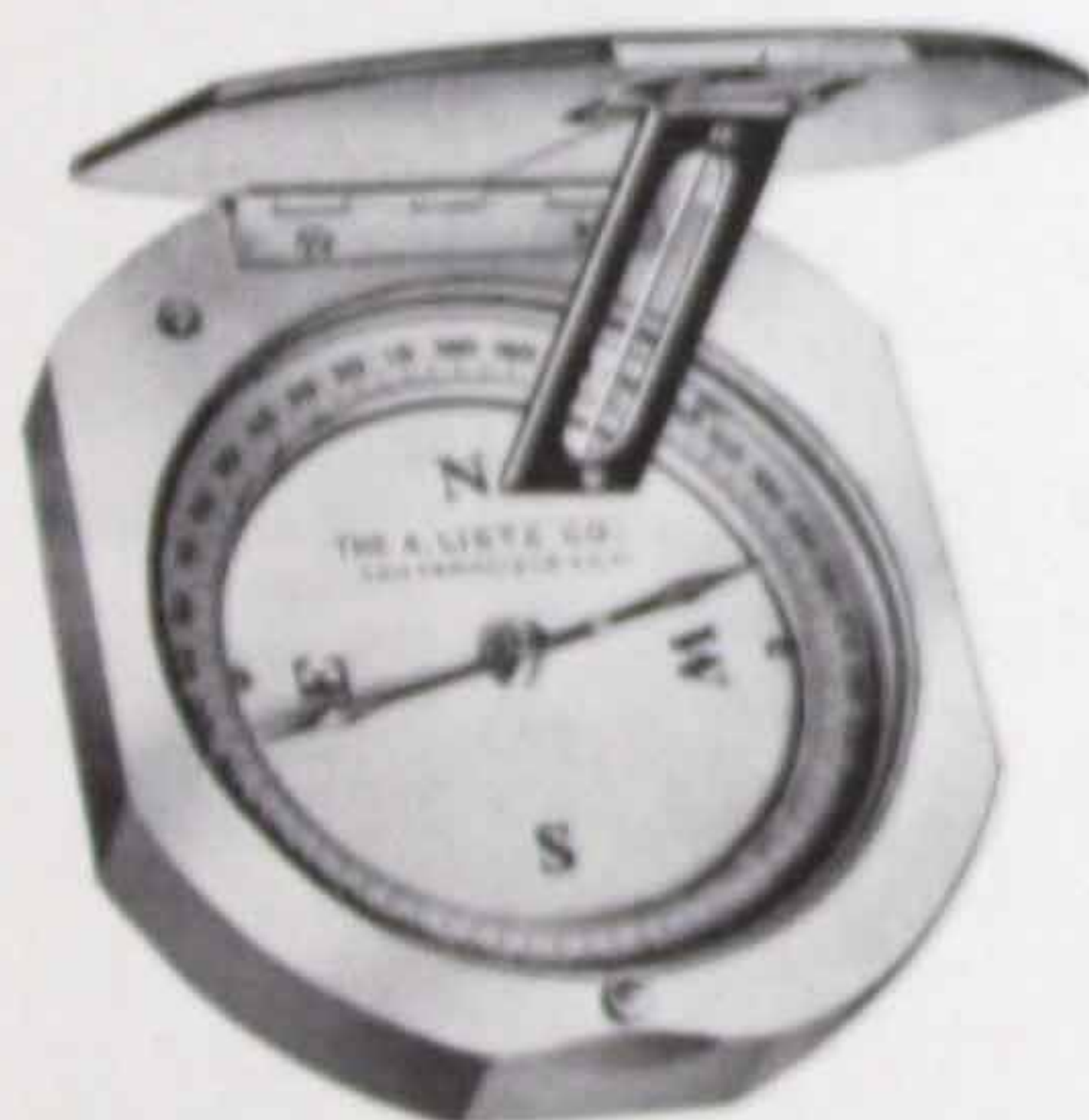
EFFERENT
EFFETE

SURVEYING COMPASSES



No. 140LC. Surveying and Cruisers Compass. Aluminum case with folding sights, raised compass ring graduated to degrees, numbered in quadrants. Variation ring. Compass needle 3 inches long with jeweled center and stop. Circular spirit level inside compass box. Instrument complete with ball and socket joints for mounting on tripod or Jacob staff, in sewed leather case with shoulder strap.
Code Word, **EFFACTO**

For extra parts, Jacob staff and tripod for Surveying Compass No. 140LC see page 88.



ALUMINUM CASE COMPASSES

As made by us for the U. S. Forest Service

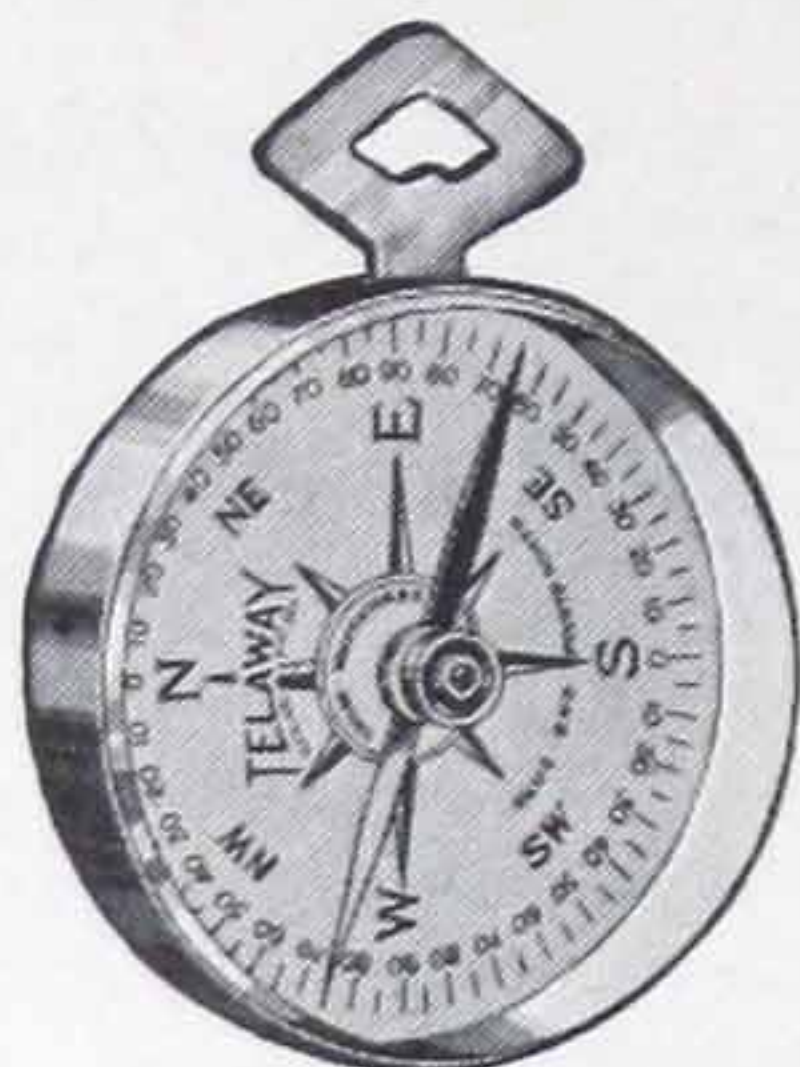
These aluminum case compasses are light and strong and moisture will not affect them. The compass ring is so arranged that the declination of the needle can be set off. Improved models No. 153S and 153SA have a folding sight vane under the cover and are fitted with a flange for mounting on camera tripod.

No. 153S

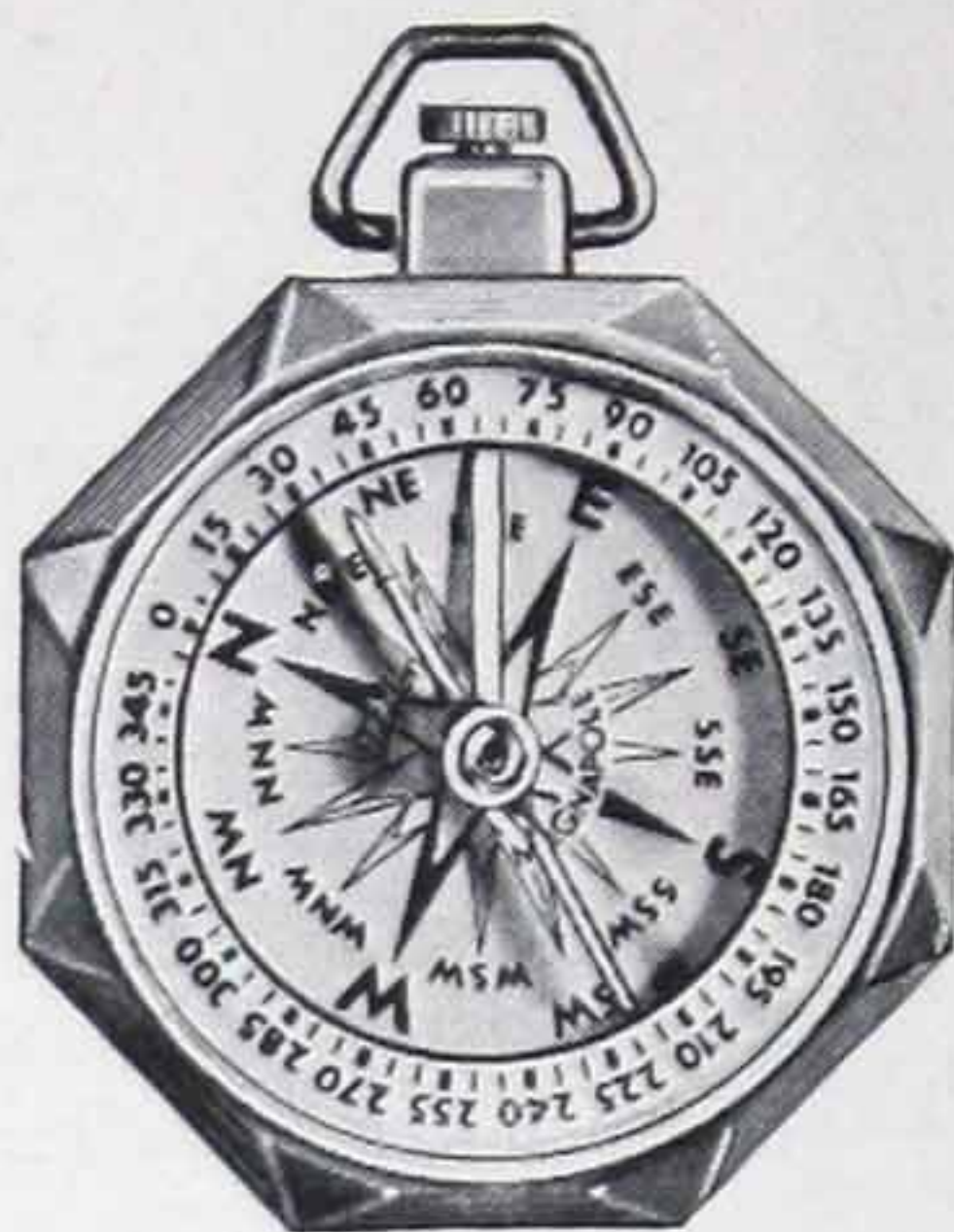
- | | | |
|-------------------|--|----------------------------|
| No. 152. | Aluminum case compass, hinged cover with sight line, 2 in. needle with jeweled center and automatic stop. Raised metal ring graduated 0—360. | Code Word
EFFIST |
| No. 152A. | Same as No. 152 but graduated in quadrants. | EFFIX |
| No. 153S. | Aluminum case compass similar to No. 152 with folding sight vane and flange for mounting on camera tripod. | EFFOBE |
| No. 153SA. | Same as No. 153S but graduated in quadrants. | EFFOIT |

SEE PRICE LIST IN BACK OF CATALOG

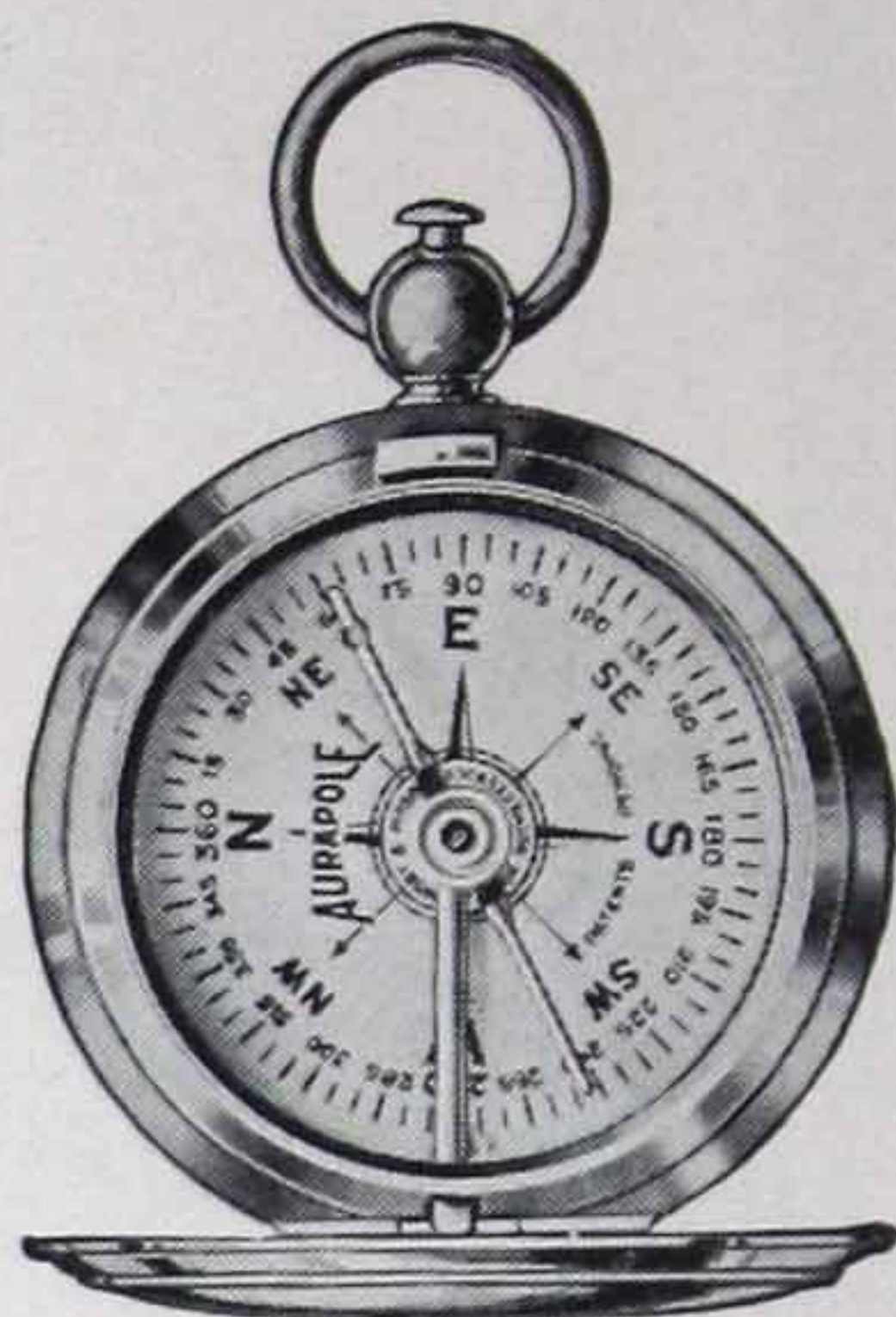
POCKET COMPASSES



156
(Metal Case)



158
(Bakelite Case)



159
(Metal Hunting Case)

- Code Word
- | | | |
|---------|--|---------|
| No. 156 | Pocket Compass, blue-bronzed case, card dial, jeweled needle 1¼ inches long..... | EFFOT |
| No. 158 | Pocket Compass, bakelite case, aluminum dial, jeweled bar needle 1¼ inches long with stop..... | EFFOUL |
| No. 159 | Pocket Compass, white metal hunting case, aluminum dial, jeweled bar needle 1¼ inches long with stop..... | EFFOYER |
| No. 160 | Pocket Compass, bakelite case with floating aluminum dial instead of needle with stop..... | EFFRON |
| No. 161 | Pocket Compass, white metal hunting case, with floating aluminum dial instead of needle with stop... | EFFRUIT |
| No. 165 | Same as No. 161, but the north and south points of the dial are treated with a permanently luminous compound permitting night reading..... | EFFUSE |



No. 167

- | | | |
|---------|---|-------|
| No. 167 | Pocket Sight Compass, watch pattern, with folding sights. Jeweled needle, self-acting stop, 2 in..... | EGALE |
| No. 168 | Same as No. 167 with Clinometer..... | EGART |

SEE PRICE LIST IN BACK OF CATALOG

BRUNTON POCKET TRANSIT



Showing Brunton Transit on Ball
and Socket Tripod Head No. 100C.



No. 101A

- | | | |
|-----------|---|----------------------|
| No. 101. | Brunton Pocket Transit, graduated 0-360..... | Code Word
EGLANTO |
| No. 101A. | Brunton Pocket Transit, graduated in quadrants..... | EGLONBO |

The BRUNTON PATENT POCKET TRANSIT has attained the greatest sale of any instrument for preliminary surveying on the surface or underground.

A PERCENT GRADE SCALE has now been added to the instrument face which grades may be read directly and without computation from the oblique view.

This feature together with the double level on the mirror, improved view sight spectrum and enlarged sighting aperture in mirror with blousing lens, makes this instrument superior to competitors.

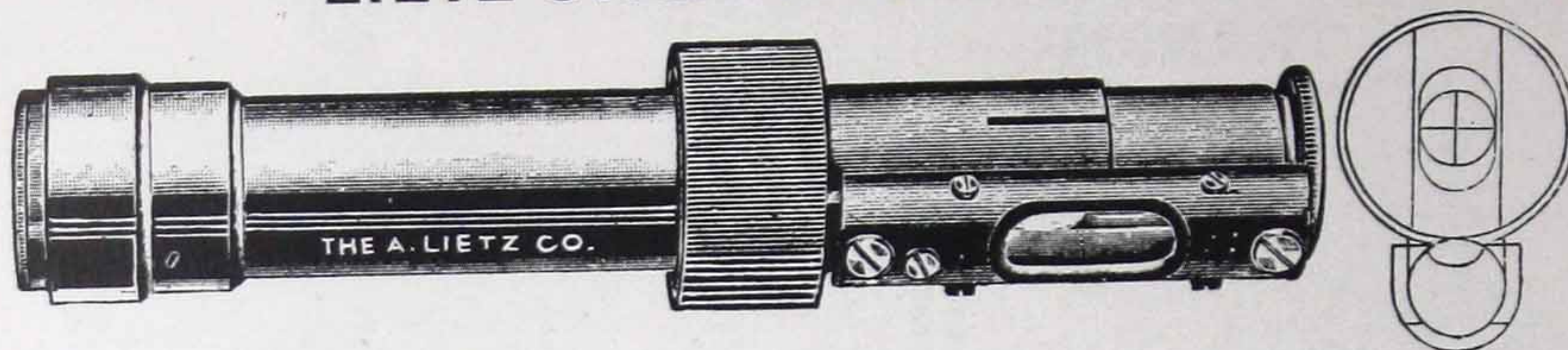
ACCESSORIES FOR BRUNTON POCKET TRANSITS

- | | | |
|-------------|---|--------------------|
| No. 105A. | Leather case for Brunton Transit, with belt strap only..... | Code Word
ELAND |
| No. 105B. | Leather case for Brunton Transit, with sling strap..... | ELAPSE |
| No. 105B.B. | Leather case for Brunton Transit, tripod head, and tripod with sling strap..... | ELANIN |
| No. 105C. | Ball and Socket Tripod Head for Brunton Transit..... | ELASTIC |
| No. 105D. | Collapsible Metal Tripod for Brunton Transit..... | ELATE |
| No. 105E. | Level Bubble for Brunton Transit, loose..... | Each |
| No. 105F. | New Mirror for Brunton Transit..... | |
| No. 105G. | New Cover Glass for Brunton Transit..... | |
| No. 105H. | New wire ring to hold glass cover..... | |
| No. 105I. | New needle for Brunton Transit..... | |
| No. 105J. | New Double Bubble set..... | |
| No. 105K. | New graduated Compass ring..... | |
| No. 105L. | Circular Level Bubble only (unmounted)..... | |

Geologists' Pick, see page 112.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ STADIA HAND LEVEL



- No. 188.** Lietz Stadia Hand Level, 5½-inch, erecting telescope with focusing screw, magnifying power 5×, with stadia hairs set 1:100. In sewed leather case..... Code Word, **ELECTION**

The Stadia Hand Level has cross and stadia hairs which are focused by moving the eyepiece in or out. The focusing of a distant object is accomplished by rotating the milled head collar. When using the instrument, it is held so that the level bubble is below the telescope. The bubble shows on the reflecting surface, equally spaced on each side of the field of view. When using instrument in subdued light a clear vision can be obtained by holding a piece of white paper or the back of the hand at an angle of about 45° under the bubble.

LIETZ WIZARD-ADJUSTMENT HAND LEVELS



Wizard Adjustment

Wizard-Adjustment Hand Levels are the latest development of the Lietz laboratories. These have a simplified, positive and permanent adjustment. The cross line is etched directly on the level vial, which is permanently set in its housing. The Prism is easily removed for cleaning and can be quickly replaced. Adjustment is made more easily and permanently by sliding the prism, which is then rigidly secured by two set screws.

Superior illumination and definition is also obtained.

- No. 189.** Locke Hand Level, 5 inch, **Wizard Adjustment**, Heavy Construction, Nickel Finish, with draw-out eyepiece and magnifying lens for bubble. In leather case with belt loop..... Code Word, **ELECTRON**
- No. 190.** Locke Hand Level, 5 inch, **Wizard Adjustment**, Heavy Construction, Durable Black Finish, with draw-out eyepiece and magnifying lens for bubble. In leather case with belt loop..... Code Word, **ELEGANT**
- No. 190A.** Locke Hand Level, 5 inch, **Wizard Adjustment**, Heavy Construction, Durable Black Finish, Fixed eyepiece. In leather case with belt loop. Code Word, **ELENOR**
- No. 191.** Hand Level, 6 inches, **Wizard Adjustment**, Heavy Construction, Durable Black Finish, magnifying lens for bubble mounted directly in barrel. In leather case with belt loop..... Code Word, **ELENTO**

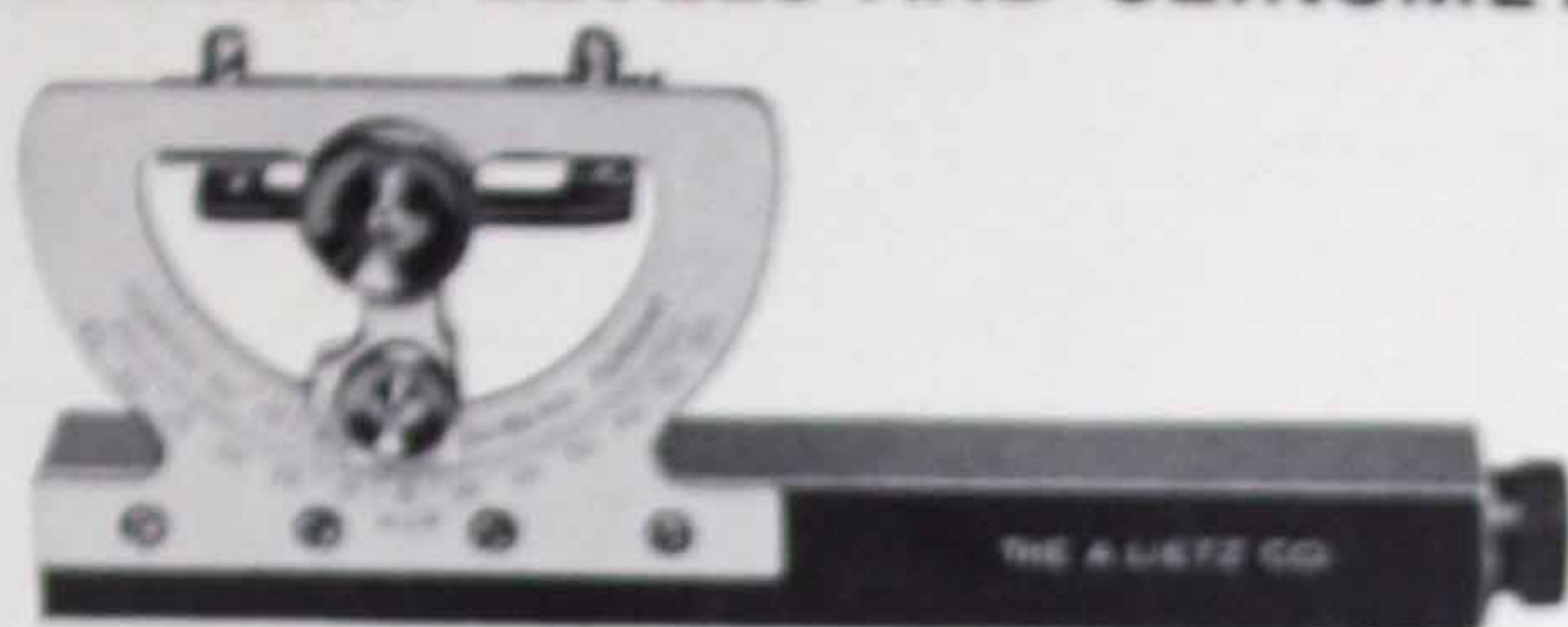
SQUARE HAND LEVEL



No. 192

- No. 192.** Square type combination hand and bench Level, 5-inch, in leather case. Code Word, **ELEVATOR**
- No. 192A.** Same as No. 192, but without leather case... Code Word, **ELEVAU**

LIETZ ABNEY LEVELS AND CLINOMETERS



No. 195PD

No. 195DS. (Old No. 195.) Abney Hand Level, Clinometer and Slope Measurer, 5-inch, with arc graduated to degrees 0-90 in both directions with vernier reading to 10 minutes. Also a slope scale 1:1 to 1:10 reading each way. In leather case with belt loop. Code Word, **ELFFIRE**

No. 195PD. (Old No. 195A.) Same as No. 195DS, but with arc graduated to degrees 0-90 in both directions with vernier reading to 10 minutes, and with a per cent scale from 1 to 100%. In leather case with belt loop. Code Word, **ELFLOCK**

TOPOGRAPHIC ABNEY LEVEL



The Topographic Abney Level, as made by us for the U. S. Forest Service, is 6 1/4 inches long and has a 4-inch arc. Arcs can be obtained with various graduations and are interchangeable. The graduations are clear and far enough apart to make the use of vernier unnecessary.

No. 198PD. Topographic Abney Level, arc graduated one side in percent, other side in degrees, in sewed leather case with belt loop. Code Word, **ELKHEAD**

No. 198PT. Topographic Abney Level, arc graduated one side in percent, other side topographic arc, in sewed leather case with belt loop. Code Word, **ELKFORK**

The graduations on the topographic arc indicate the difference in elevation in feet for one chain (66 feet) of horizontal distance. If used in connection with topographic trailer tape, described on page 140, chaining is greatly expedited in steep and rugged country.

EXTRA PARTS FOR HAND LEVELS

- No. 190LC** Leather case for hand levels Nos. 189, 190 and 190A.
- No. 191LC** Leather case for hand level No. 191.
- No. 192LC** Leather case for hand level No. 192.
- No. 195LC** Leather case for Abney levels Nos. 195DS and 195PD.
- No. 198LC** Leather case for topographic Abney levels Nos. 198PD and 198PT.
- No. 197A** Object glass for round hand levels.
- No. 197B** Eyepiece glass for round hand levels.
- No. 197C** Prism for round hand levels.
- No. 197D** Half lens for round hand levels.
- No. 197E** Level bubble unmounted.

SEE PRICE LIST IN BACK OF CATALOG

ANEROID BAROMETERS



In connection with our line of Barometers, Barographs, Thermographs, etc., we desire to call attention to the importance of selecting such articles. We aim to carry only the most reputable makes of these instruments.

With our factory facilities and years of experience we are in a position to offer our patrons the accommodation of testing each individual instrument under pressure and in connection with a standard mercurial barometer, thus assuring our friends of that satisfaction seldom enjoyed when purchasing through other sources.

FIRST QUALITY WATCH FORM ANEROID BAROMETERS

- No. 200.** Gilt Case, open face, 1 $\frac{3}{4}$ -in., silvered metal dial with altitude scale 3000 feet in 10-ft. divisions. Compensated for temperature. In velvet-lined morocco case.....Code Word, **EPACT**
- No. 200C.** Same as No. 200, but 8000 feet. Altitude scale in 50-foot divisions. In velvet-lined morocco case.....Code Word, **EPAULET**
- No. 200D.** Same as No. 200, but 10,000 feet. Altitude scale in 100-foot divisions. In velvet-lined morocco case.....Code Word, **EPHOD**
- No. 200E.** Same as No. 200, but 12,000 feet. Altitude scale in 100-foot divisions. In velvet-lined morocco case.....Code Word, **EPICTURE**

SECOND QUALITY WATCH FORM ANEROID BAROMETERS

- No. 202C.** Same pattern as No. 200, compensated for temperature, silvered metal dial, with altitude scale to 8000 feet in 100-foot divisions.
.....Code Word, **EPIIDILE**
- No. 202E.** Same as No. 202C, but 12,000 feet. Altitude scale in 100-foot divisions.....Code Word, **EPIGRAM**

ANEROID BAROMETERS IN METRIC DIVISIONS

For our export trade we carry the above Aneroid Barometers registering in the metric system at corresponding prices.

SEE PRICE LIST IN BACK OF CATALOG

POCKET SIZE ANEROIDS

Best Quality



Showing Pocket Aneroid No. 205A in Lietz Special Leather Case No. 206D, as adopted by timber cruisers.

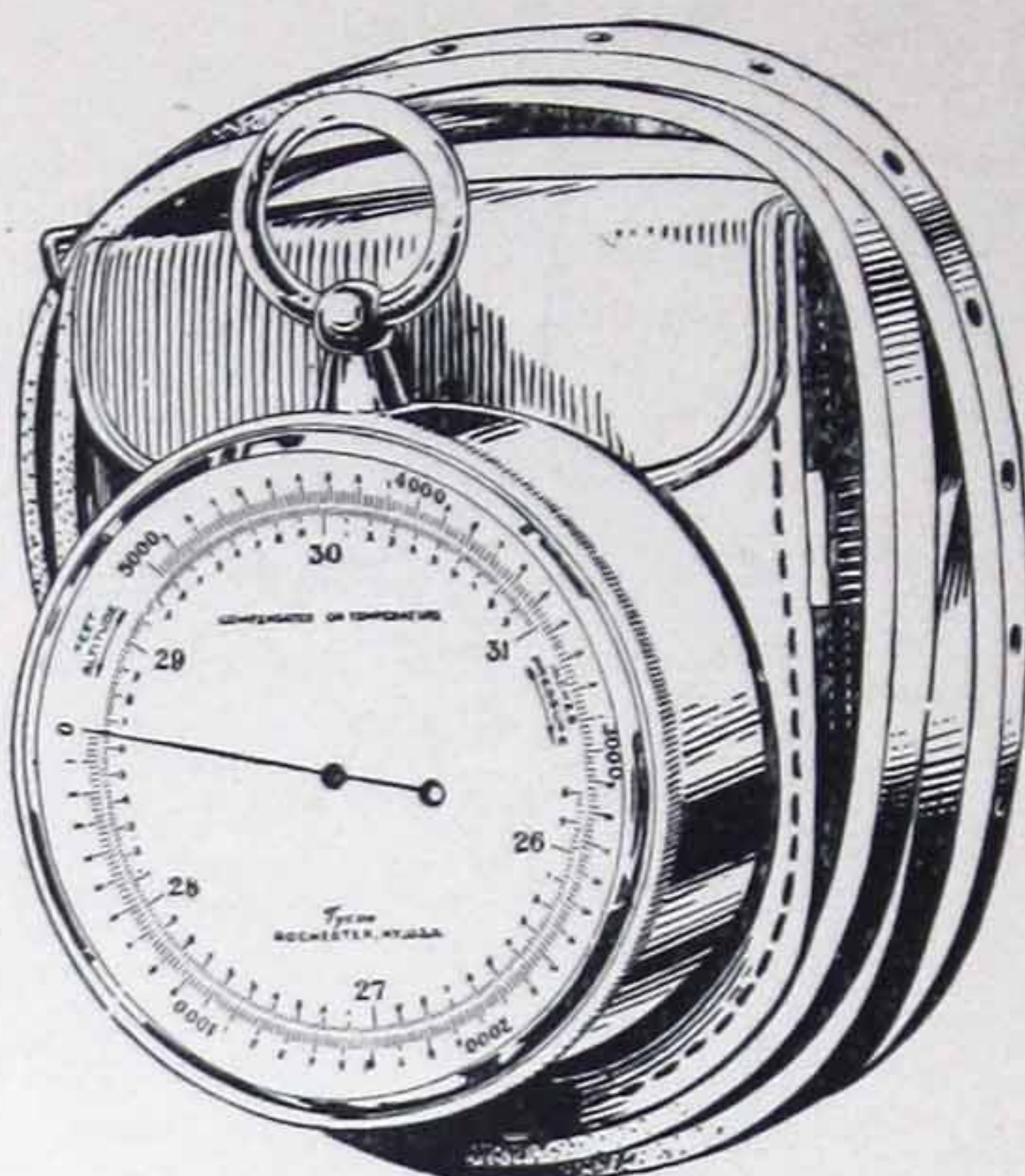
This is a most suitable instrument for the engineer and timber cruiser and for all reconnaissance purposes.

Cable Ward

- | | | |
|-----------|---|----------|
| No. 205. | Pocket Size Aneroid, 2½ inches, gilt case. Compensated for temperature, silvered metal dial with altitude scale 3000 ft. in 10-ft. divisions, in velvet-lined morocco case. | EPILOGUE |
| No. 205A. | Same as No. 205, but 5000-ft. altitude scale in 20-ft. divisions, in velvet-lined morocco case. | EPIMORE |
| No. 205C. | Same as No. 205, but 8000-ft. altitude scale in 30-ft. divisions, in velvet-lined morocco case. | EPIBOOE |
| No. 205D. | Same as No. 205, but 10,000-ft. altitude scale in 50-ft. divisions, in velvet-lined morocco case. | EPISTERM |
| No. 205E. | Same as No. 205, but 12,000-ft. altitude scale in 50-ft. divisions. | EPI TAPH |
| No. 205F. | Same as No. 205, but 16,000 ft. altitude scale in 100-ft. divisions. | EPI THET |
| No. 206. | Leather Sling Case for Nos. 205-205F, in lieu of morocco. | |
| No. 206A. | Extra Leather Sling Case for Nos. 205-205F. | |
| No. 206B. | Extra Morocco Case for Nos. 205-205F. | |
| No. 206D. | Lietz Special Leather Case for Nos. 205-205F, as adopted by timber cruisers. If in lieu of the morocco. If extra. | |

SEE PRICE LIST IN BACK OF CATALOG

ALTITUDE BAROMETERS



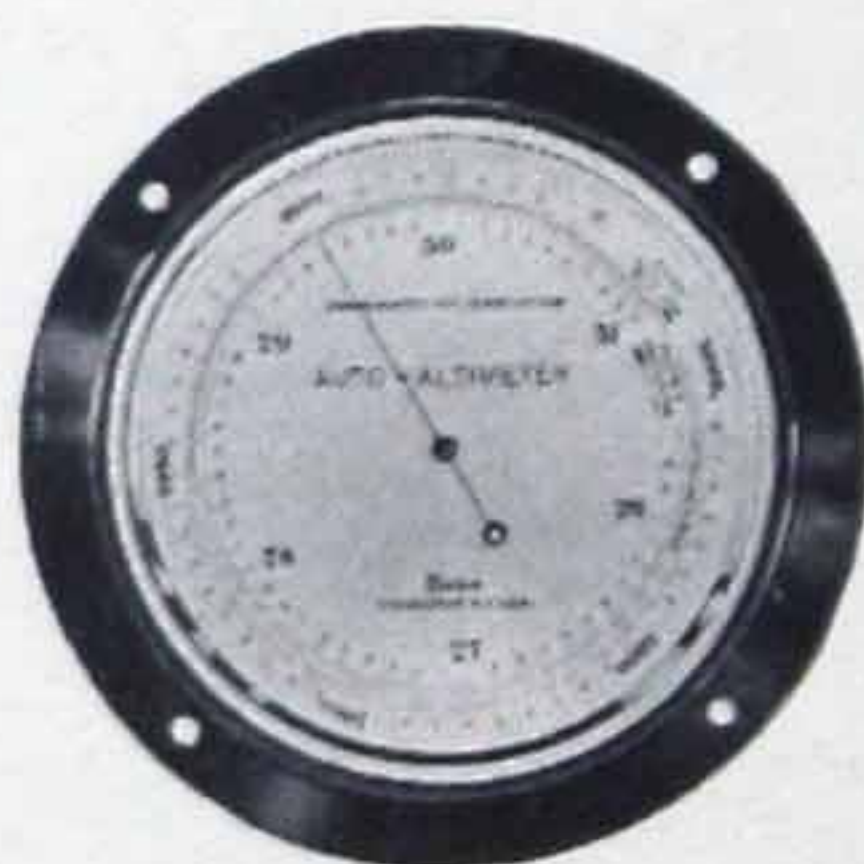
No. 205 $\frac{1}{2}$ A

These Barometers are "Direct Reading." The scales have been redesigned so that the altitude scale is in equal divisions, overcoming the difficulty met in the past in that the altitude scales were unequally divided, and as a consequence they had to be used with the zero of the scale at a fixed point and a sum worked out for correct readings, or the scales were made to revolve so the zero could be set at 0 feet. If used in the latter manner the readings were only approximate and grew in error the higher the altitude. With the "direct reading" scale all chances of error are eliminated.

No. 205 $\frac{1}{2}$ A. Altitude Barometer 2 $\frac{3}{4}$ -inch silvered metal dial, aluminum case, altitude scale 5,000 ft. in 20 foot divisions, in velvet lined leather sling case.....Code Word, **EQUATIC**

No. 205 $\frac{1}{2}$ D. Altitude barometer 2 $\frac{3}{4}$ -inch silvered metal dial, aluminum case, altitude scale 10,000 ft. in 50-foot divisions, in velvet-lined leather sling case.....Code Word, **EQUATOR**

AUTO ALTITUDE BAROMETERS



No. 208 $\frac{1}{2}$

These instruments give interesting information and valuable data on heights of hills and mountains encountered on your trips. Evenly-divided scales make the determination of altitudes a simple matter.

When at rest at any one place the instrument can be used to forecast probable weather conditions.

No. 208 $\frac{1}{2}$. Auto Altimeter, 3-inch metal dial, with flange at back for screwing to dashboard. Altitude scale 10,000 ft. in 50-foot divisions.
.....Code Word, **EQUERRY**

SEE PRICE LIST IN BACK OF CATALOG

SPECIAL SURVEYING ANEROID BAROMETERS



Nos. 208AL-211ALD

These instruments are specially designed for use of the engineer and geologist for ascertaining and checking slight differences in elevation. Made in two sizes, 3 and 5 inches in diameter, and in aluminum cases. Silvered metal dial with vernier on rack movement, reading lens arranged to traverse entire circle. Carefully selected movement, compensated for temperature, each instrument in leather sling case.

FACE 5-INCH DIAMETER

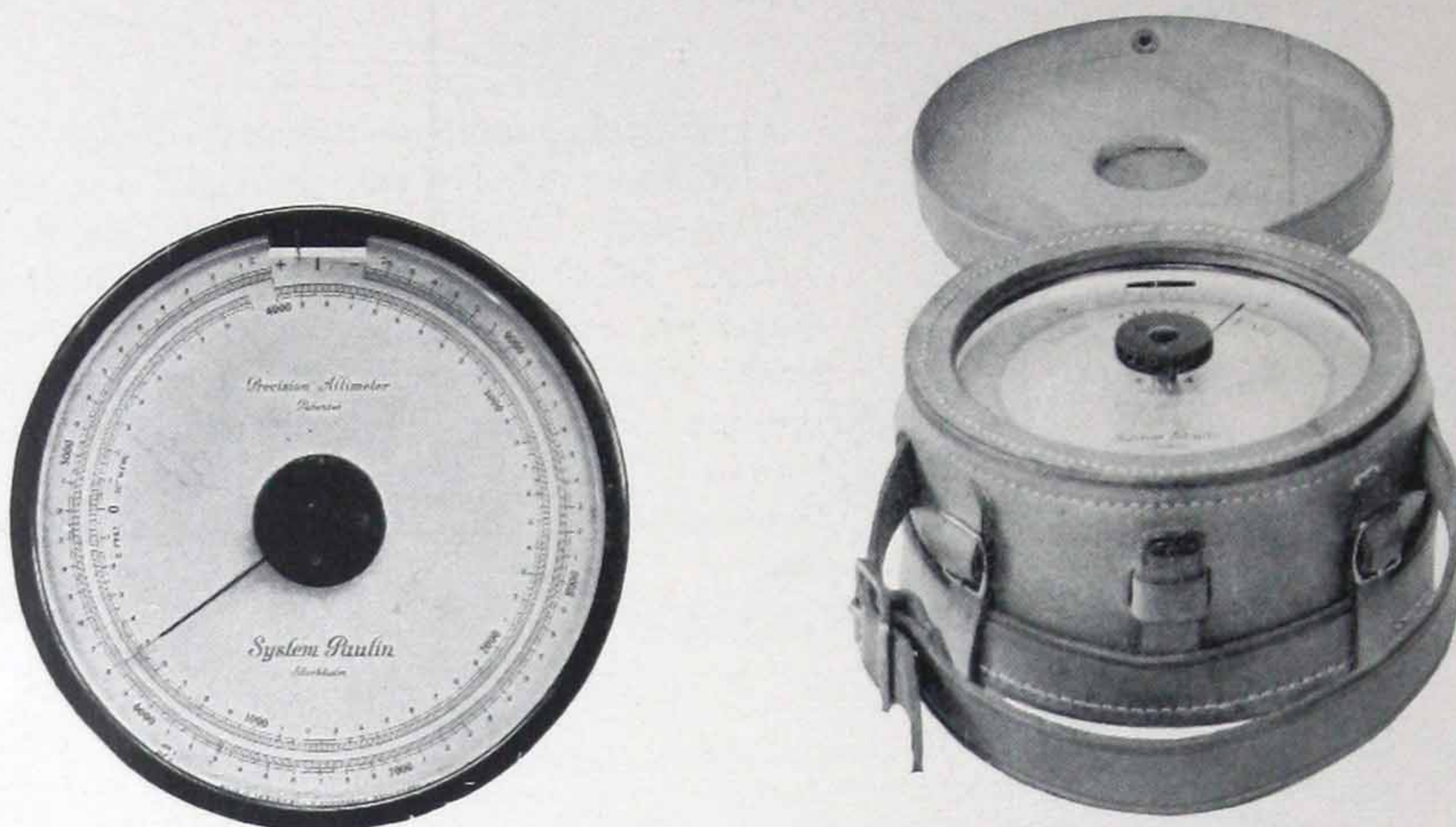
No. 208AL.	Altitude Scale 3,000 feet, vernier reading to 1 foot.	Code Word ERGOT
No. 208ALB.	Altitude Scale 6,000 feet, vernier reading to 1 foot.	ERMIN
No. 208ALD.	Altitude Scale 10,000 feet, vernier reading to 2 feet.	EROTIC
No. 208ALF.	Altitude Scale 16,000 feet, vernier reading to 2 feet.	ERUDITE

FACE 3-INCH DIAMETER

No. 211AL.	Altitude Scale 3,000 feet, vernier reading to 1 foot.	Code Word EXCURSION
No. 211ALB.	Altitude Scale 6,000 feet, vernier reading to 2 feet.	EXEMPLAR
No. 211ALD.	Altitude Scale 10,000 feet, vernier reading to 2 feet.	EXOGEN

SEE PRICE LIST IN BACK OF CATALOG

PAULIN SYSTEM ALTIMETERS



Paulin Altimeters have no inertia due to friction. They are free from elastic hysteresis or lag. They show without correction for deflection the exact air pressure as accurately as a mercury barometer. They are fully compensated for temperature.

The instruments are so constructed and the scales are so graduated as to be easily and accurately read to a much finer degree than heretofore possible. Altimeter No. 213-A1 is graduated to two-foot intervals, without the use of vernier, and the fine needle readily splits these graduations to enable a very accurate reading in inches.

Reading of the instruments is by a totally different method than heretofore employed, being based on the "zero gauging" method, which enables the operator to attain the greatest accuracy of adjustment. The zero point of the scale is equal to 30" of mercury.

Because of the PRECISION of these instruments, new and extensive fields of utility are opened to them, where heretofore instruments of this kind could not be used.

- No. 213-A1.** Paulin Altimeter, total range 4,600 feet graduated to 2 foot intervals. with barometric scale. Diameter $4\frac{7}{8}$ in., height 2 in., weight 18 oz. In leather case with shoulder strap.... Code Word, **EMILAR**
- No. 213-A2.** Paulin Altimeter, total range 11,600 feet graduated to 10 foot intervals. with barometric scale. Diameter $4\frac{7}{8}$ in., height 2 in., weight 18 oz. In leather case with shoulder strap.... Code Word, **EMIGYL**
- No. 213-A3.** Paulin Altimeter, total range 10,600 feet (-900 to +9,700 feet) graduated to 10 foot intervals. Diameter $3\frac{1}{4}$ in., height 2 in., weight 11 oz. In leather case with shoulder strap.... Code Word, **EMINOR**

SEE PRICE LIST IN BACK OF CATALOG

BRASS CASE BAROMETERS



Nos. 220-223

We offer the highest grade of Compensated Barometers. Guaranteed dependable, each instrument being tested before delivery under our Standard Vacuum Air Pump, with the mercurial standard. Made with open-face dial and brass case, highly polished and lacquered.

No. 220.	3-inch face, each	EXSERTER
No. 221.	4-inch face, each	EXTENSOR
No. 222.	5-inch face, each	EXTERNIC
No. 223.	6-inch face, each	EXTERICK

Code Word

WALL FLANGE BAROMETERS (Brass Case)



Nos. 226-227



No. 229

These Barometers are of the same high grade as our Nos. 220-223 line, but differ from them in that they are screwed to the wall through a flange.

No. 226.	5-inch face, each	EYEBALL
No. 227.	6-inch face, each	EYELID

Code Word

MINIATURE WALL BAROMETER

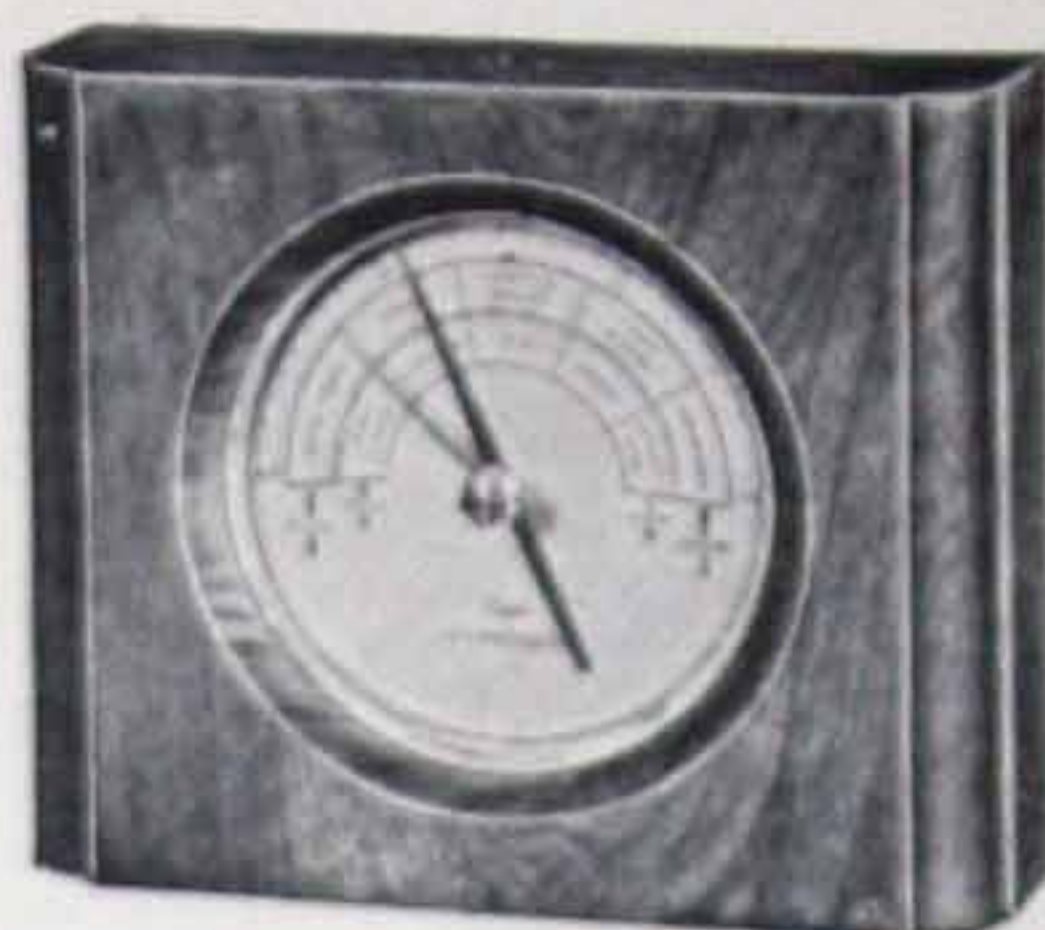
No. 229.	2 3/4-inch face in polished mahogany case, 3 3/4-inch	EYETOOTH
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SEE PRICE LIST IN BACK OF CATALOG

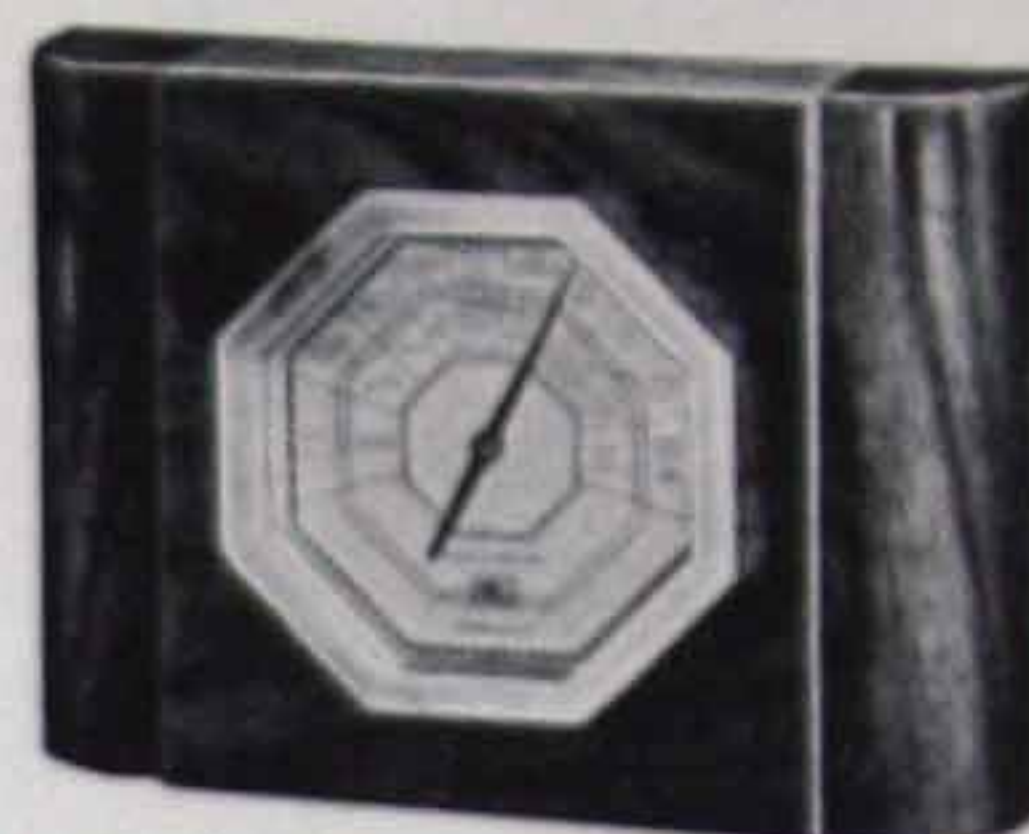
WEATHER BAROMETERS OR STORMOGUIDES



No. 230



No. 231



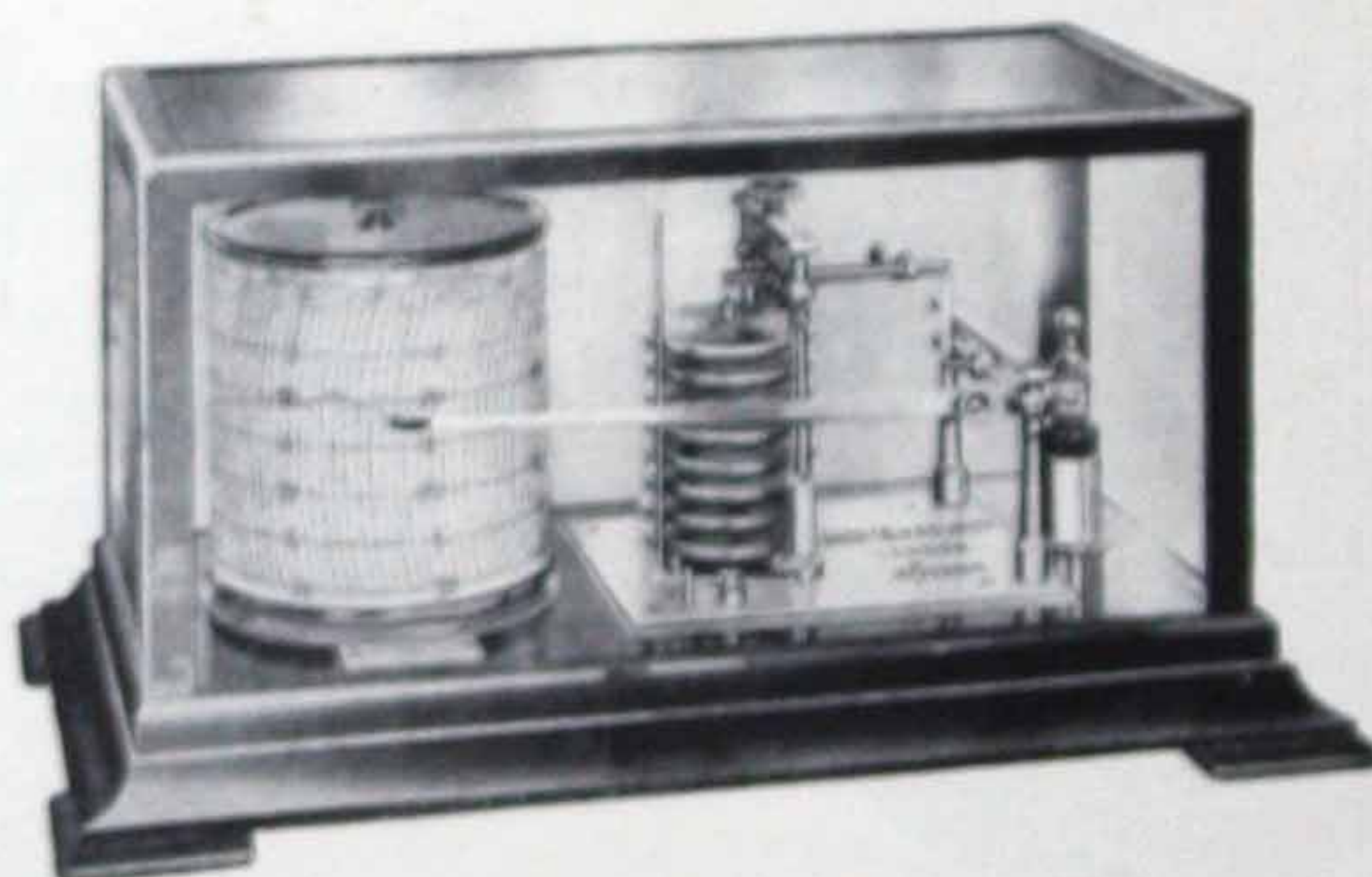
No. 232

Code Word

- No. 230. Stormoguide. Handsome black bakelite case 5 inches square with aluminum dial and chrome trim. Altitude adjustment to 3500 feet. **ETACK**
- No. 230HA. Same as No. 230 but for altitudes up to 7000 feet. **ETAD**
- No. 231. Stormoguide. Dark mahogany finish frame; 4 inch grained brass finished dial. Altitude adjustment to 3500 feet. **ETAIR**
- No. 231HA. Same as No. 231 but for altitudes up to 7000 feet. **ETAIST**
- No. 232. Stormoguide. Mahogany frame, dull-gilt brass dial, best quality compensated movement with automatic signal device showing trend of pressure. Altitude adjustment to 3500 feet. **ETAKE**
- No. 232HA. Same as No. 232 but for altitudes up to 7000 feet **ETALL**

RECORDING BAROMETERS

(Barographs)



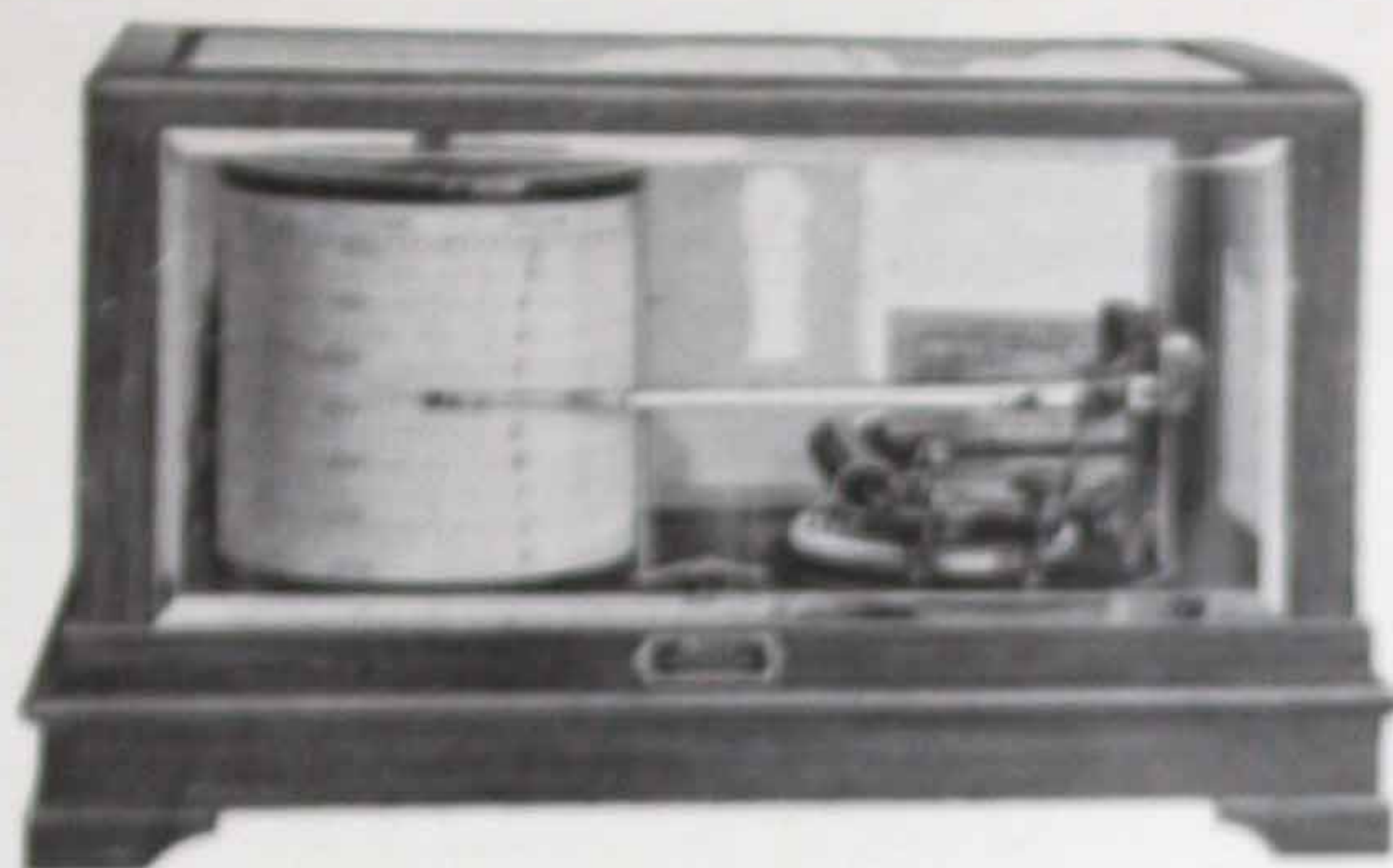
No. 240

- No. 240. Highest grade Recording Barometer. Weekly charts recording air pressure from 28 to 30.5 inches by 20ths of inch. Seven vacuum boxes, eight-day clock movement, jeweled. Complete with charts for one year and bottle of barograph ink. Code Word, **FABEL**

SEE PRICE LIST IN BACK OF CATALOG

RECORDING BAROMETERS

(Barographs)



No. 242

No. 242. Recording Barometer, simplified form. The recording pen is operated by a large vacuum chamber concealed in the base of the instrument. High-grade clock movement, jeweled, running eight days. Weekly charts recording air pressure from 28 to 30.5 inches by 20ths of inch. Complete with charts for one year and a bottle of barograph ink..... Code Word, **FABLING**

RECORDING THERMOMETER (Thermograph)



No. 244. Thermograph, gray enameled metal case, with handle and glass front, complete with year's supply of charts (No. 84-0-100 F.); (No. 85-20-120 F.); also bottle of recording ink..... Code Word, **FABLUS**

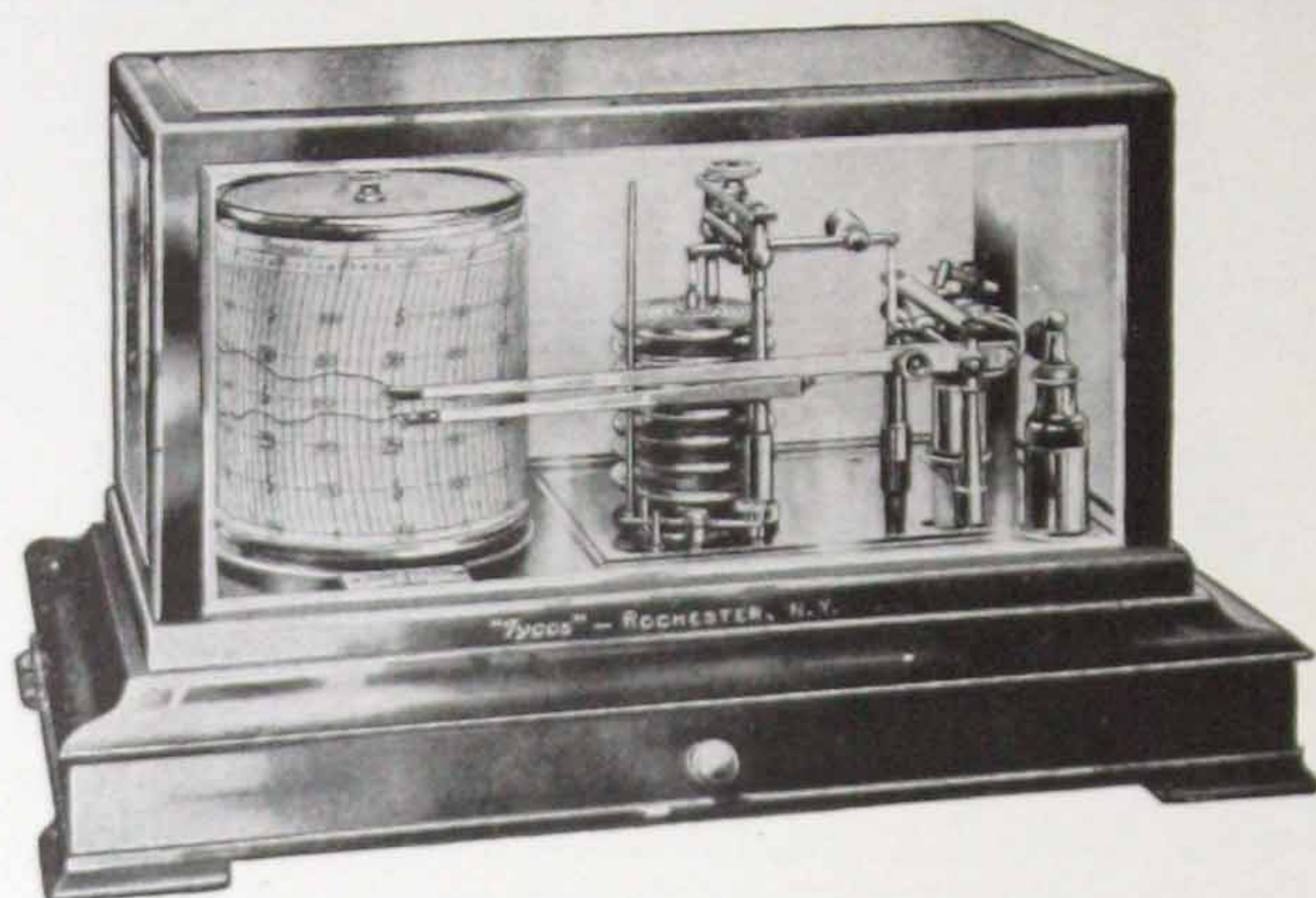
Charts showing a variety of ranges can be secured to suit particular requirements.

Write us if interested in other forms of recording thermometers or pyrometers.

The highest known average monthly temperature ever observed is that of 102 degrees F. for July at Death Valley, California. The lowest is -60 degrees F. for January at Verkhoyansk, Siberia.

SEE PRICE LIST IN BACK OF CATALOG

RECORDING BAROMETER AND
THERMOMETER
(Baro-Thermograph)



No. 248

No. 248. Baro-Thermograph. With this instrument it is possible to take both barometer and thermometer records on one chart. The range of the barometer is from 28 to 31 inches, while the thermometer shows a range of 0 to 120 degrees Fahrenheit in 2-degree lines. Two different colored inks are used, blue for the barometer and green for the thermometer, so that no confusion will arise in reading the two records. This instrument has eight vacuum boxes, all working parts exposed. Complete with charts for one year, pens and barograph inks, two colors.....Code Word, **FACULTY**

RECORDING HYGROMETER
(Hygrograph)

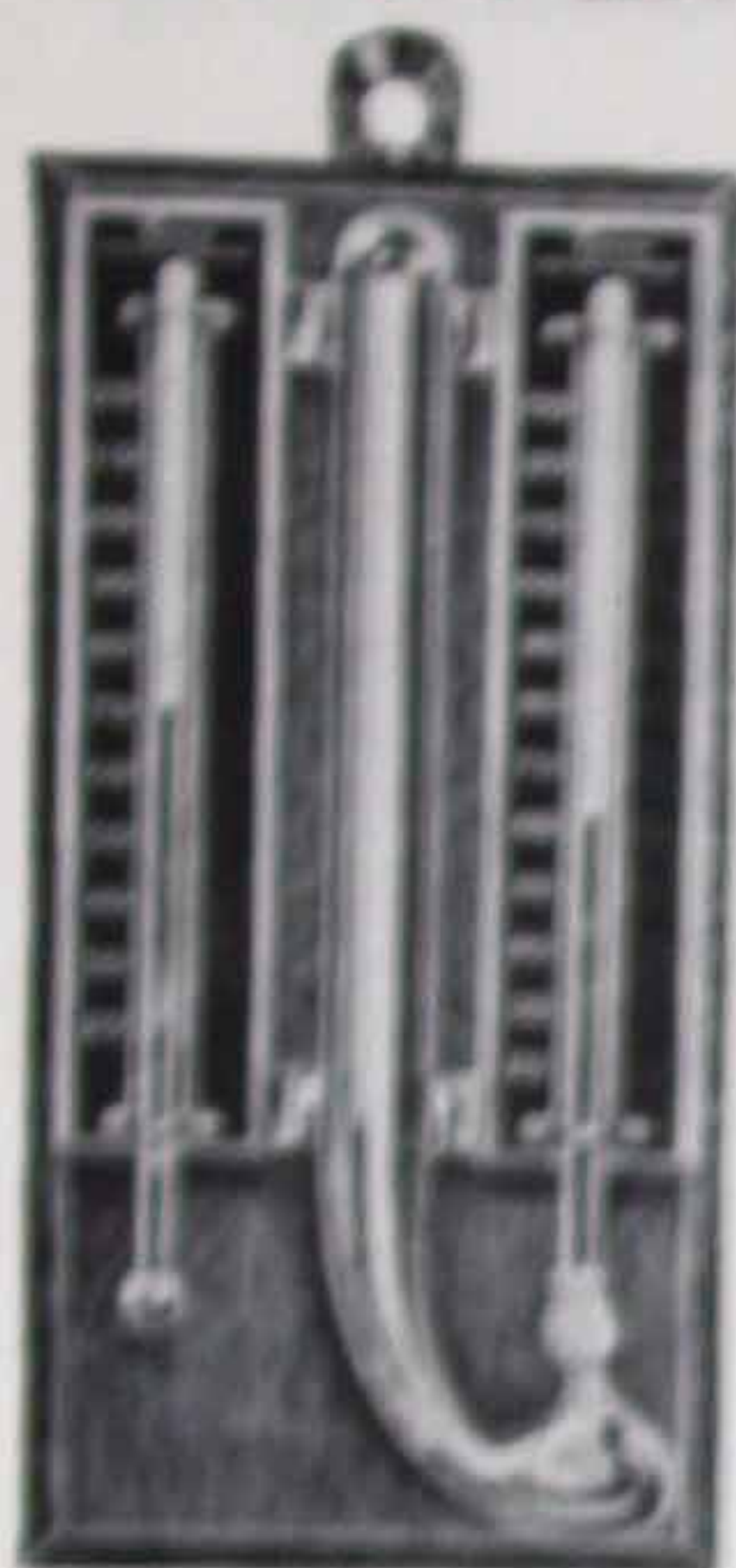
No. 249. Hygrograph. This instrument records the moisture by single per cent from 1 to 100 per cent. The recording pen responds to the expansion and contraction of a quantity of fine hair affected by the variations of humidity. In weather-proof metal case, supplied with charts for one year, and one bottle of recording ink.....Code Word, **FADING**

CHARTS AND ACCESSORIES FOR RECORDING INSTRUMENTS

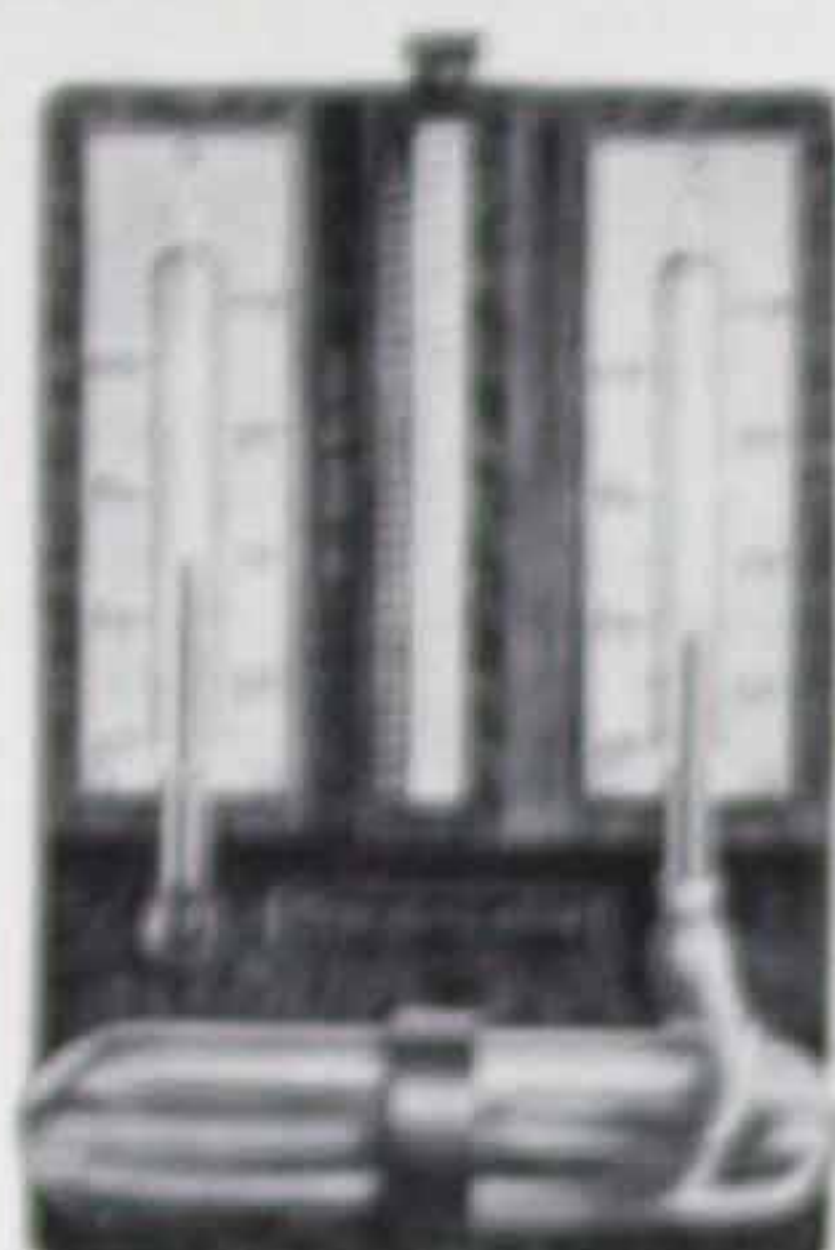
		Year's Supply Code Word	
Chart No. 2.	For Barograph No. 240.....	FAFAL	
Chart No. 83.	For Barograph No. 242.....	FAFER	
Chart No. 20.	For Baro-Thermograph No. 248.....	FAFEST	
Chart No. 84.	For Thermograph No. 244, range 0° to 100° F.....	FAFILL	
Chart No. 85.	For Thermograph No. 244, range 20° to 120° F....	FAFIN	
Chart No. 58.	For Hygrograph No. 249.....	FAFOLD	
No. 250A.	Extra Pens, ordinary.....		Each
No. 250B.	Extra Pens, V pattern.....		
No. 250C.	Recording Ink, plain bottle.....		
No. 250D.	Recording Ink, stoppered bottle.....		

SEE PRICE LIST IN BACK OF CATALOG

HYGROMETERS OR HUMIDIGUIDES



No. 252



No. 253



No. 254
Code Word

No. 252. Mason's Hygrometer (wet and dry bulb), magnifying mercury tubes, mahogany finish board, size $8\frac{1}{2} \times 4\frac{1}{2}$ inches. Approximate scale range 10 to 120 degrees. Complete with U. S. Government tables.

FAGGIN

No. 253. Mason type humidiguide, magnifying permacolor tubes, indoor temperature range. Mahogany bakelite frame with revolving humidity table complete with spare wicks and instructions.

FAGOLD

No. 254. Humidiguide. Handsome black bakelite case, chrome trim. Grained aluminum dial with indoor thermometer to match. Instrument gives relative humidity and air temperature at a glance.

FAGLOIRE

SLING PSYCHROMETERS



No. 256
Sling Psychrometer
and
Protecting Case



No. 257

No. 256. Sling Psychrometer, with 12-inch engraved stem thermometers graduated 0 to 100 degrees Fahrenheit in $\frac{1}{2}$ degrees. Code Word, **FAGLON**

No. 257. Pocket Sling Psychrometer. Code Word, **FAGUS**

Seven inches long with chain sling, 5-inch engraved stem thermometers graduated 0 to 100 degrees Fahrenheit in 1 degree, with leather carrying case.

No. 256A. Extra engraved Thermometer for No. 256.

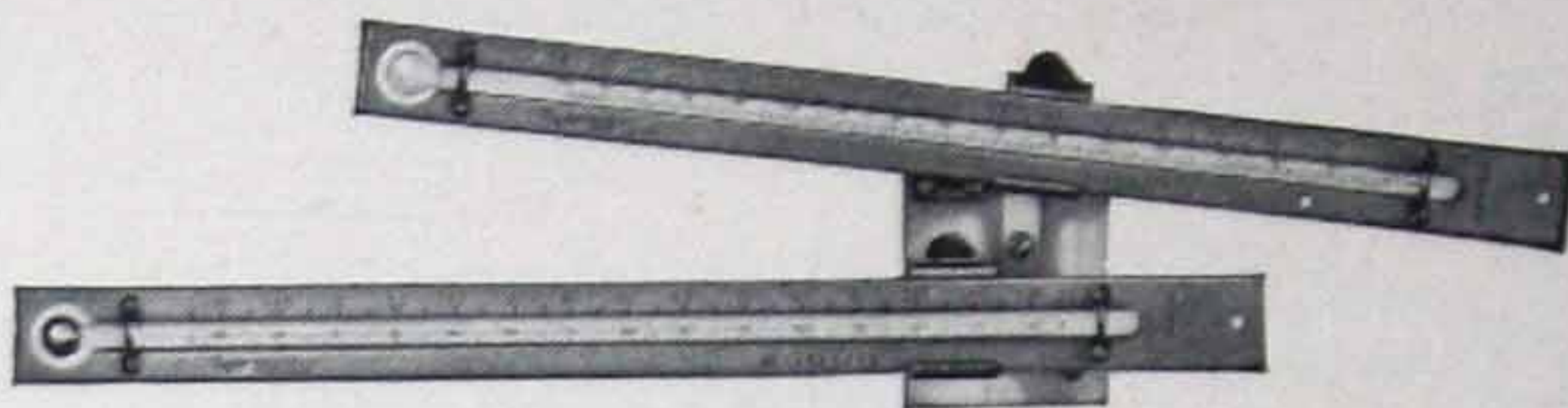
No. 257A. Extra engraved Thermometer for No. 257.

With each instrument we supply copy of U. S. Weather Bureau tables and directions for determining humidity, etc.

SEE PRICE LIST IN BACK OF CATALOG

MAXIMUM AND MINIMUM THERMOMETERS

Self-registering



No. 265

Illustration shows Weather Bureau Maximum and Minimum Set, on Townsend Support in position for reading.

Code Word

- No. 265. Weather Bureau Maximum and Minimum Set consists of maximum thermometer No. 266 and minimum thermometer No. 267 with certificates complete with Townsend Metal Support No. 268.....**FALCON**

The Townsend Support enables the thermometers to be properly exposed and handily manipulated for resetting.

- No. 266. Maximum Registering Thermometer, Weather Bureau Pattern. Tube is mercury filled, range 20° to 120° F., graduated in 1° divisions, mounted on aluminum scale. Made in accordance with U. S. Weather Bureau specifications. Each in a box, with certificate.....**FALCONER**

- No. 267. Minimum Thermometer, Weather Bureau Pattern. The plain-front tube is spirit-filled, range 20° to 60° below zero to 120° F., graduated in 1° divisions, mounted on aluminum scale. Made in accordance with U. S. Weather Bureau specifications. Each in a box, with certificate.....**FALCONRY**

- No. 268. Townsend Support. Brass plate with two studs of unequal height having carriers and locking screws for thermometers. The taller support rotates freely, to permit setting of the maximum thermometer after reading. The shorter support makes a quarter turn, to enable the minimum thermometer to be set. Each in a box.....**FALCONTA**



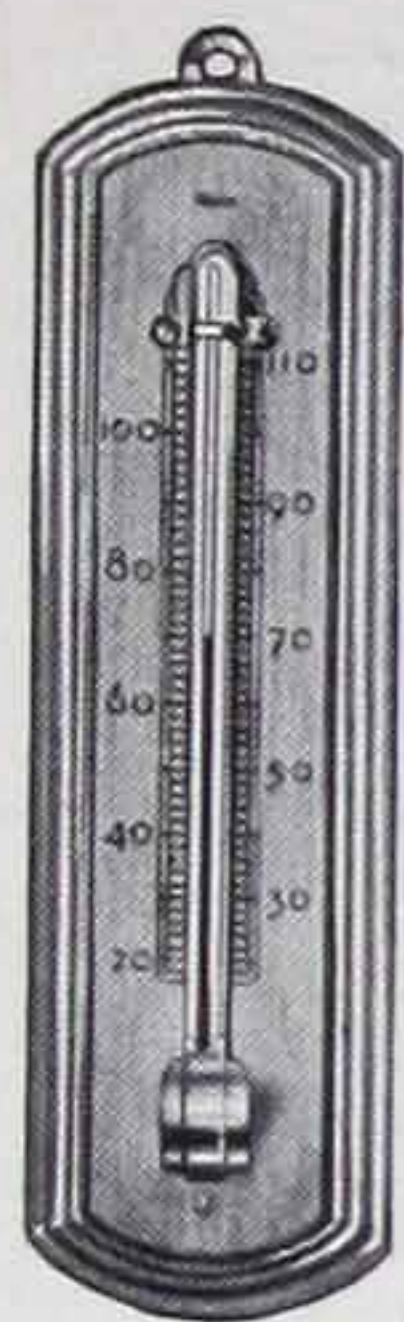
No. 279



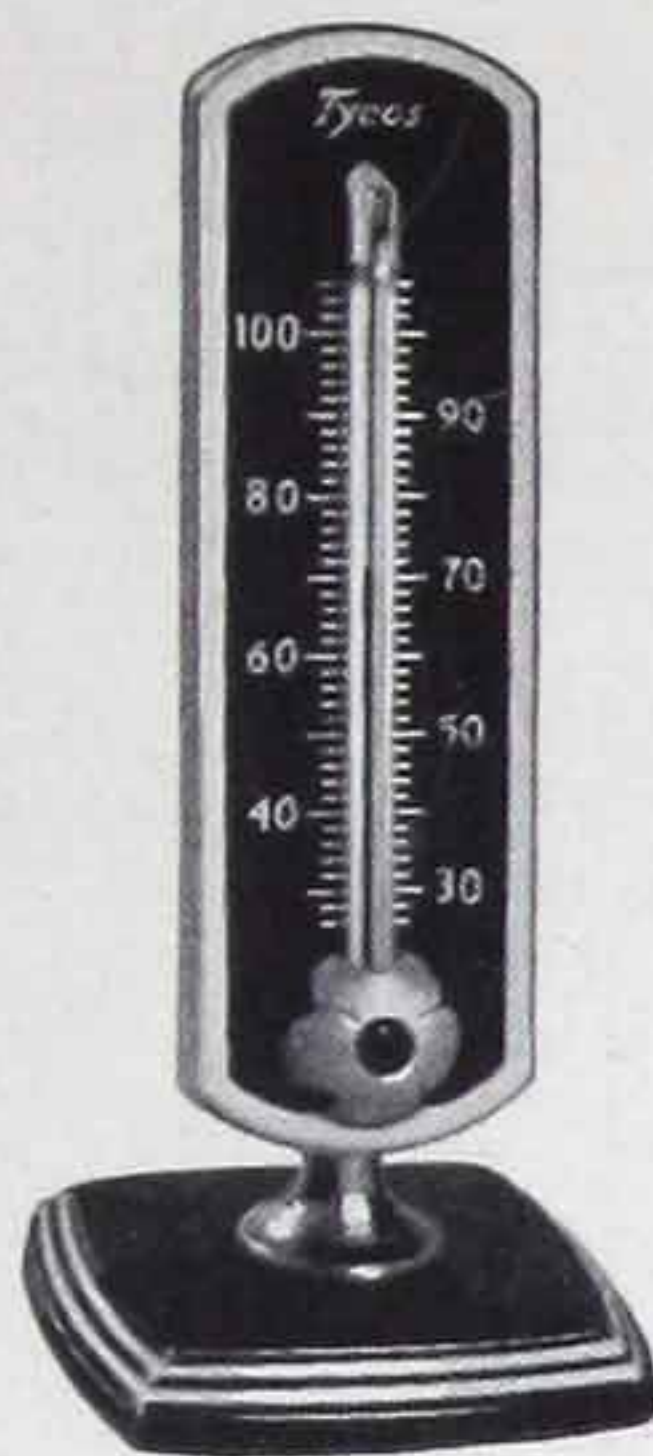
No. 281

- No. 279. Self-Registering Maximum and Minimum Thermometer. Outdoor temperature range, magnifying glass tubes. The 10" scale is one piece of lacquered brass with flanged edges and protecting hood at top. Designed for wall mounting. Each in a box, with setting magnet....**FALCHION**
- No. 280. Self-Registering Thermometer, boxwood, black filled figures, polished on all sides. Scale range 10 to 40 degrees below zero to 120 degrees F. above, 10-inch....**FALLOW**
- No. 281. Self-registering Thermometer. Metal scale finished black with white figures. Scale range 10 degrees below zero to 120 degrees F. above, 7¾ inch.....**FALMIN**

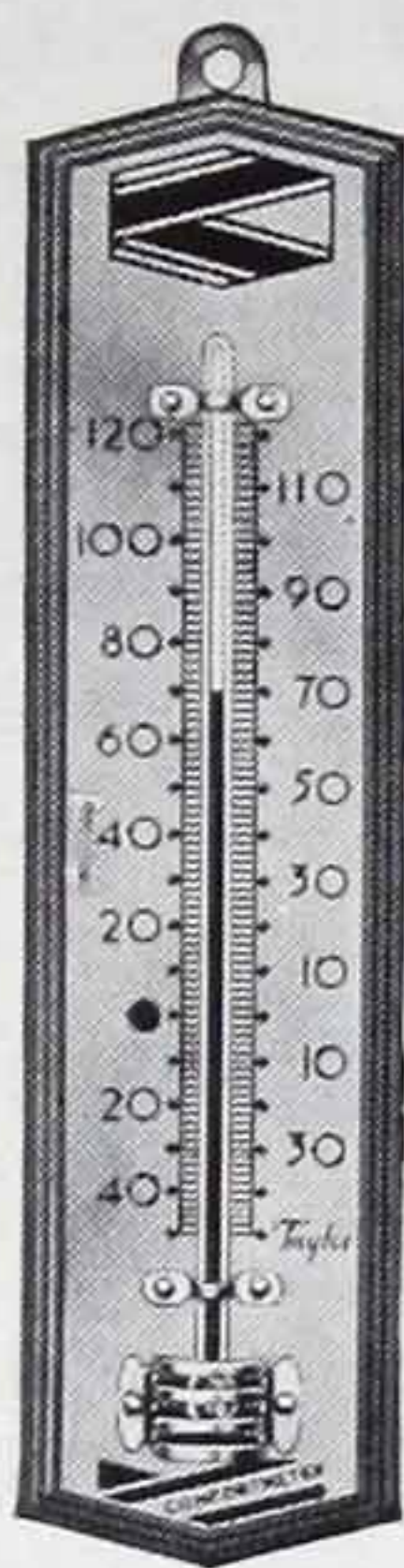
THERMOMETERS



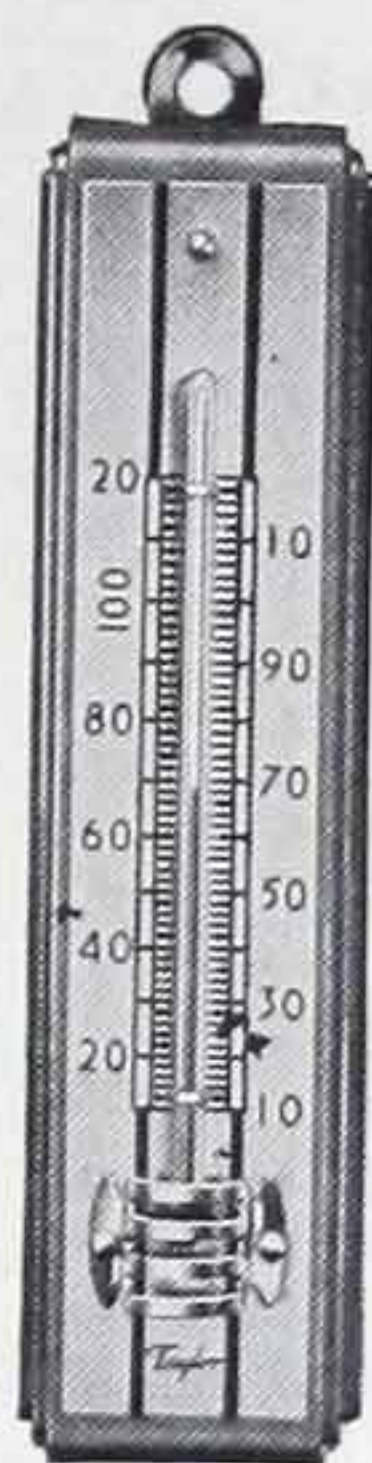
No. 284



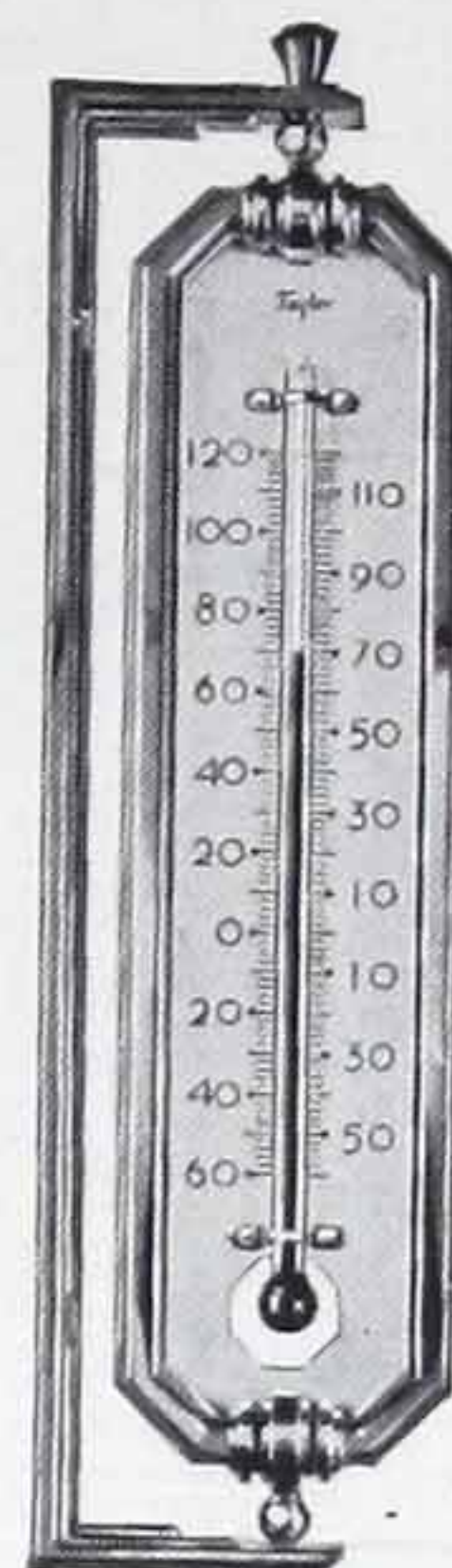
No. 288



No. 294



No. 295



No. 297

- No. 282.** Copper Case Thermometer, 10 inch, magnifying mercury tube, oxidized brass scale, white-filled figures and graduations. Scale range 10 to 40 degrees below zero to 120 degrees F. above. **FALSETTO**
- No. 284.** Wall Thermometer, 6". Magnifying permacolor tube, handsome relief-line finished brass scale, hardwood back finished in a variety of colors, indoor temperature range. **FAMAR**
- No. 285.** Same as No. 284 but 8" **FAME**
- No. 288.** Standing Thermometer, 4". Magnifying permacolor tube, scale with burnished silver figures and graduations. Back and base finished in a variety of colors, indoor temperature range. **FAMIAX**
- No. 290.** Petite Model Wall Thermometer, 3½". Magnifying permacolor tube, black scale with white figures and graduations. Indoor temperature range. **FAMILON**
- No. 294.** Wall Thermometer, 7½". Magnifying permacolor tube satin brass finish scale with sharp black figures and graduations. Back finished in a variety of colors, indoor temperature range. **FAMINE**
- No. 295.** Wall Thermometer, 5¼". Magnifying permacolor tube, satin brass finish scale with sharp black figures and graduations, molded wood back finished in a variety of colors, indoor temperature range. **FAMIST**
- No. 296.** Window Thermometer 8½". Magnifying permacolor tube, black figures and graduations on white vitreous enameled scale, outdoor temperature range, with mounting brackets **FAMIOR**
- No. 297.** Window Thermometer 8½" DeLuxe model, similar to No. 296 with modern polished chrome frame. **FAMITTY**

Code Word

SEE PRICE LIST IN BACK OF CATALOG

ENGRAVED STEM CHEMICAL THERMOMETERS

Ordinary Grade

Plain mercury tubes, $\frac{1}{4}$ -inch diameter, each in a turned wood box.



	Length	Scale	Approximate scale range	Sub- division	Each
No. 300A.....	12"	Fahrenheit,	—20° to 120°	2°	
No. 300B.....	12"	Fahrenheit,	0° to 220°	2°	
No. 300C.....	12"	Fahrenheit,	30° to 300°	2°	
No. 300D.....	14"	Fahrenheit,	30° to 400°	2°	
No. 300E.....	16"	Fahrenheit,	30° to 650°	2°	
No. 301A.....	12"	Centigrade,	—10° to 110°	1°	
No. 301B.....	12"	Centigrade,	0° to 150°	1°	
No. 301C.....	14"	Centigrade,	0° to 200°	1°	
No. 301D.....	16"	Centigrade,	0° to 350°	1°	

ARMORED ENGRAVED STEM THERMOMETERS For 3-inch Immersion

For all purposes requiring the use of Engraved Stem Thermometers we recommend, wherever practical, the armored type. The lessened liability to breakage in use will be found to more than compensate for the added cost.



	Length	Scale	Scale Range	Sub- division	Each
No. 305A.....	12"	Fahrenheit,—	40° to 120°	1°	
No. 305B.....	12"	Fahrenheit,	0° to 220°	2°	
No. 305C.....	12"	Fahrenheit, +	30° to 300°	2°	
No. 305D.....	14"	Fahrenheit, +	30° to 400°	2°	
No. 305E.....	16"	Fahrenheit, +	30° to 600°	2°	
No. 305F.....	16"	Fahrenheit, +	30° to 750°	2°	
No. 305G.....	16"	Fahrenheit, +	100° to 950°	5°	
No. 306A.....	12"	Centigrade,—	10° to 100°	1°	
No. 306B.....	12"	Centigrade,	0° to 150°	1°	
No. 306C.....	14"	Centigrade,	0° to 200°	1°	
No. 306D.....	16"	Centigrade,	0° to 300°	1°	
No. 306E.....	16"	Centigrade,	0° to 400°	1°	
No. 306F.....	16"	Centigrade, +	50° to 510°	2°	

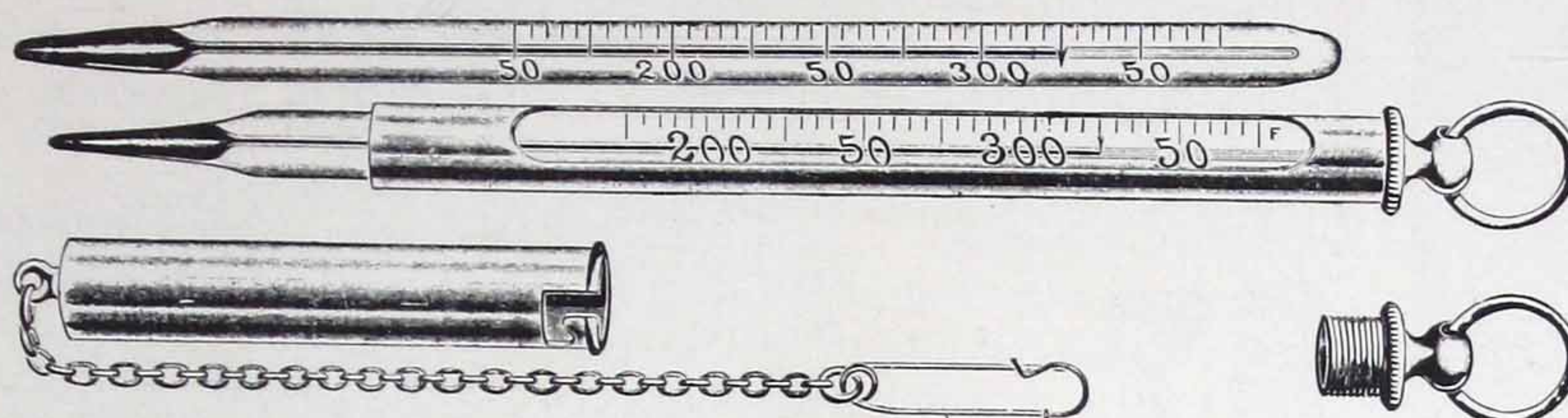
Extra Thermometers for Above

No. 0305A	0305B	0305C	0305D	0305E	0305F	0305G
	0306A	0306B	0306C	0306D	0306E	0306F
Each						

SEE PRICE LIST IN BACK OF CATALOG

ARMORED ASPHALT-TESTING THERMOMETERS

Standard Grade



No. 312

Asphalt-Testing Thermometers, all glass, engraved stem, nickel-plated brass armor, made exceptionally robust to meet the requirements of use.

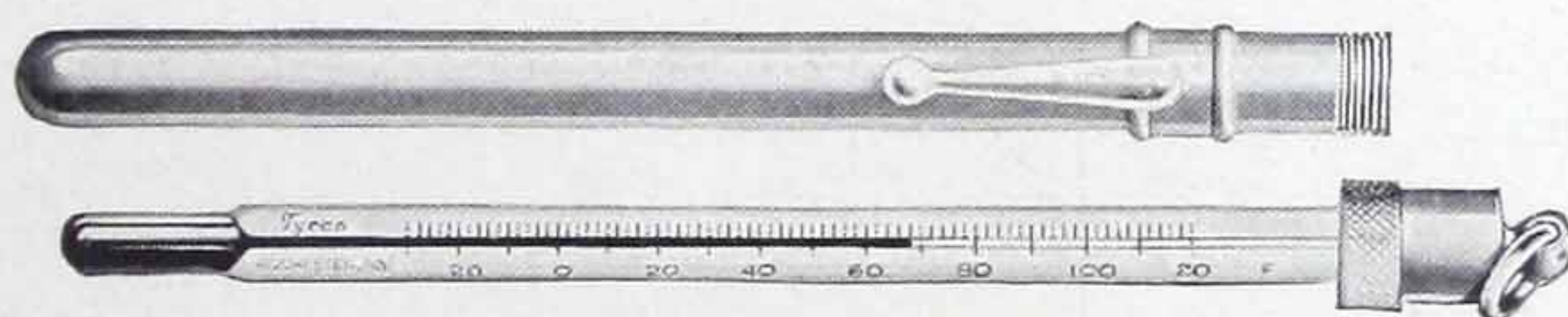
- | | | |
|-----------------|---|-----------------|
| No. 310. | Length 16 inches, temperature range 100 to 600 degrees, for use in testing asphalt..... | FANCIER |
| No. 311. | Length 16 inches, temperature range 200 to 750 degrees, for use in testing sand..... | FANDANGO |
| No. 312. | Length 6 inches, temperature range 200 to 400 degrees, for use of inspector..... | FANG |

Code Word

Extra Thermometers for Above

- | | | |
|------------------|------------------------------------|----------------|
| No. 0310. | Extra Thermometer for No. 310..... | FANCARE |
| No. 0311. | Extra Thermometer for No. 311..... | FANBELT |
| No. 0312. | Extra Thermometer for No. 312..... | FANWING |

POCKET THERMOMETERS



No. 315

- | | | |
|-----------------|--|----------------|
| No. 315. | Pocket Thermometer, 5-inch, engraved stem, nickel-plated brass screw case and chain, magnifying mercury tube. Approximate scale range 30 degrees below zero to 120 degrees above, F..... | FANBOLT |
| No. 316. | Same as No. 315, but scale range 20 to 220 degrees F.. | FANHOLD |

Code Word

SEE PRICE LIST IN BACK OF CATALOG

UNITED STATES WEATHER BUREAU STANDARD RAIN GAUGE



No. 320



No. 321 (showing funnel and receiver)

The rain collected by the funnel flows into the receiver, which is of smaller diameter than the funnel and so adjusted that the readings are magnified 10 times. To take reading, insert measuring stick through the funnel into the receiver and note how high it is moistened. The sticks are graduated in 10ths and 100ths of an inch, one inch of rain actually being 10 inches on the stick.

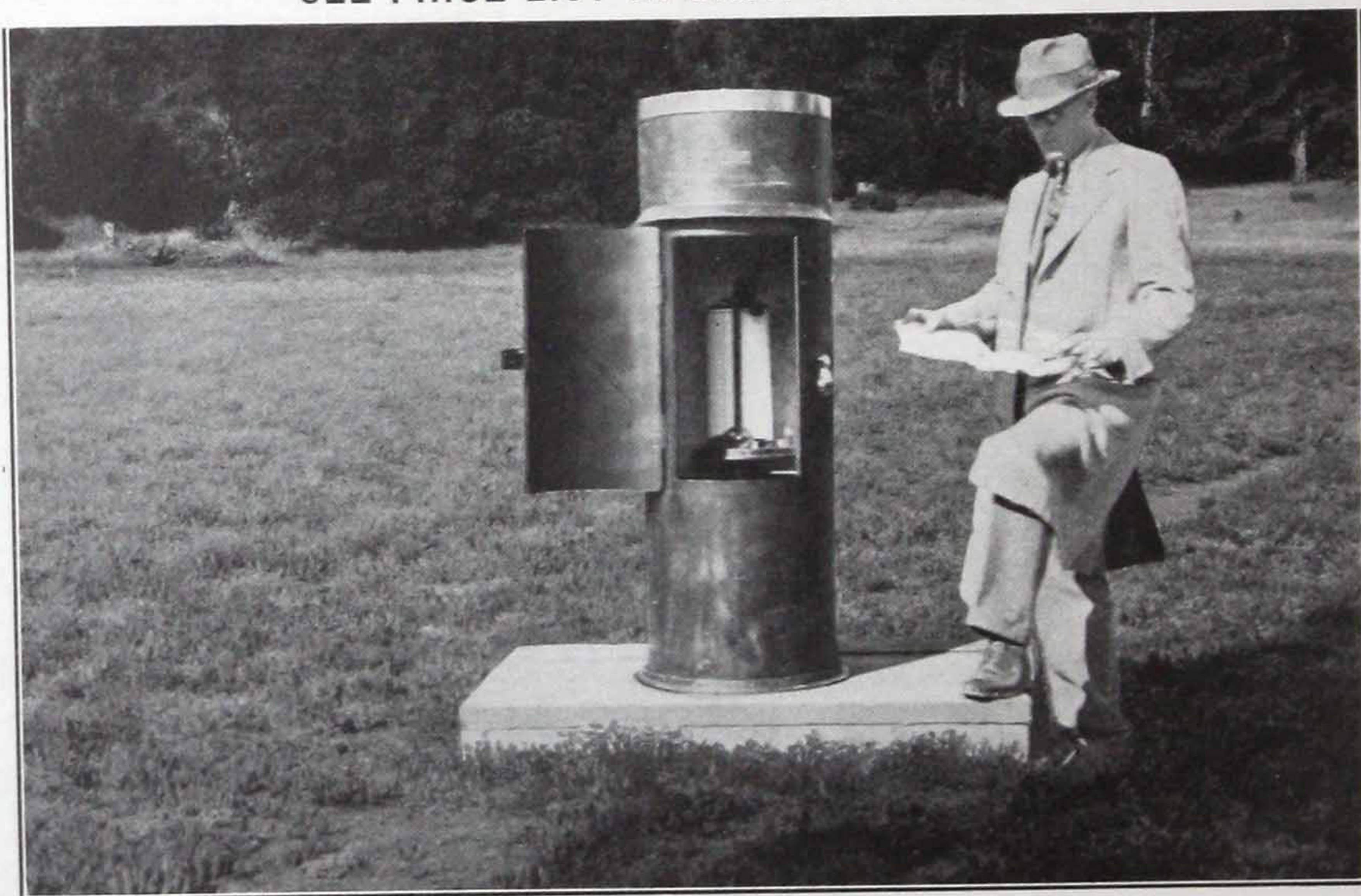
To measure snow, remove the funnel and receiver and after collecting let it melt. Then pour into receiver and measure same as rain. Also measure full depth of snow.

- No. 320. United States Weather Bureau Standard Rain Gauge, 25 inches high, and 8 inches in diameter. Constructed of heavy sheet metal. Receiver and measuring tube of seamless drawn brass tubing; complete with measuring stick. Code Word, **FANION**
- No. 321. Similar to No. 320, but 13 inches high, and receiver 3 inches in diameter, with measuring stick. Packed in cardboard container for shipment. Each. Code Word, **FANTAIL**

EXTRA MEASURING STICKS FOR ABOVE

- No. 320A. Extra Measuring Stick for No. 320. Code Word, **FARAD**
- No. 321A. Extra Measuring Stick for No. 321. Code Word, **FARINA**

SEE PRICE LIST IN BACK OF CATALOG



LIETZ RAINFALL RECORDER No. 322 IN THE FIELD

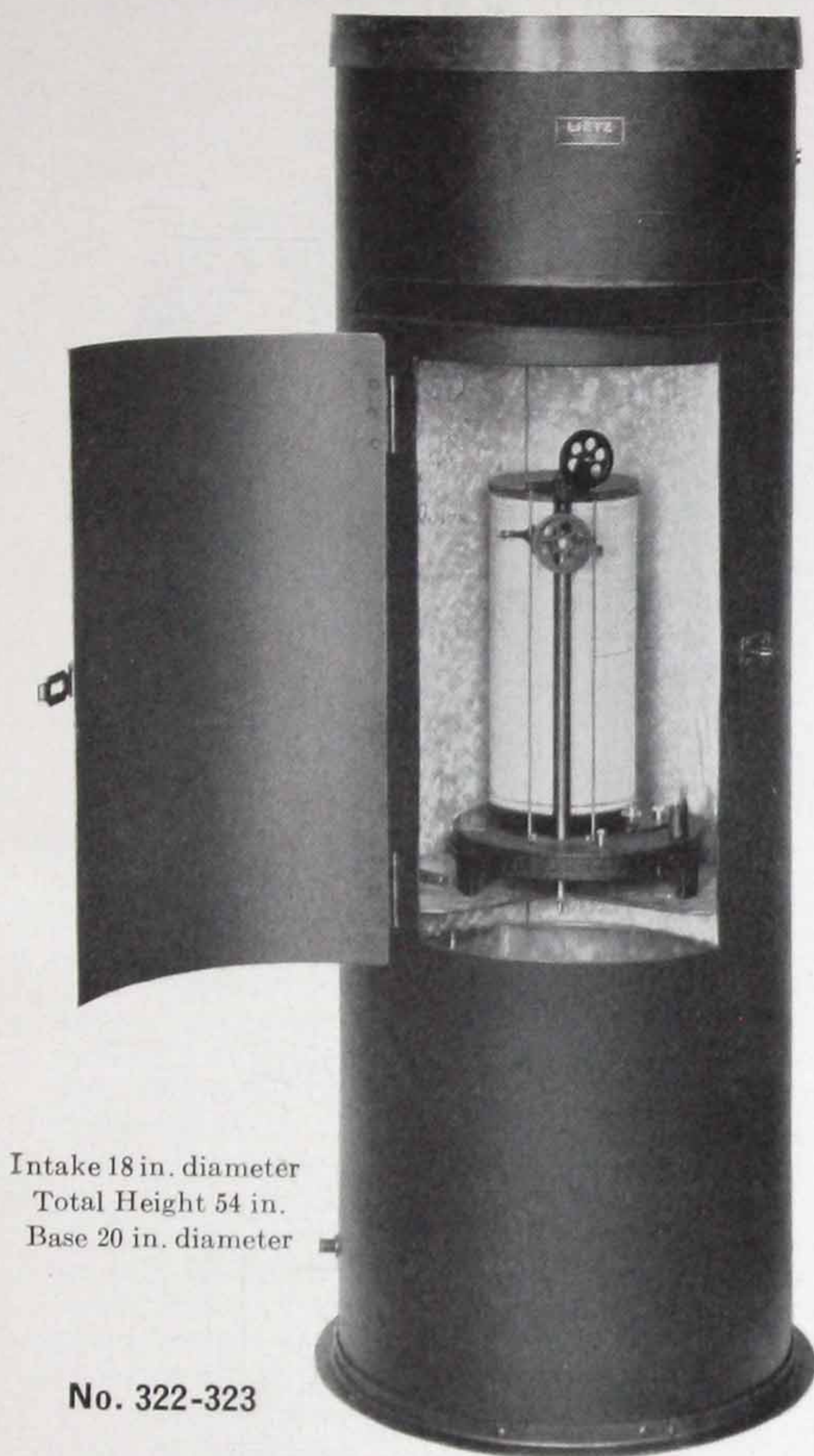
LIETZ RECORDING RAIN GAUGE

To meet the demand for an accurate, and yet moderately priced Recording Rain Gauge, we have developed a Rain Gauge in which the Lietz Vertical Water Stage Recorder becomes the recording element. This instrument produces a graph showing the accumulated rainfall during any period of time, the chart indicating clearly its intensity, as well as its volume.

The intake funnel is constructed of heavy copper and is 18" in diameter. The rain received runs through a copper drain pipe into a collector tank, also constructed of copper, which is of a size so as to magnify the rainfall two times. Over this Collector Tank a Lietz Vertical Water Stage Recorder No. 356, or 357 is mounted, and as the rain accumulates a recording pen, actuated by a float in the tank, produces a graph of the rainfall.

The outer housing is constructed of heavy galvanized sheet iron, having a weather resisting lacquer finish.

The charts may be changed daily or weekly depending on the time scale desired.



Intake 18 in. diameter
Total Height 54 in.
Base 20 in. diameter

No. 322-323

No. 322. Lietz Recording Rain Gauge, with Recorder No. 356; with one time scale, weekly or daily; with 12" copper float and counterpoise, copper cable, one bottle of instrument oil, one bottle recording ink and 10 charts of record paper..... Code Word, **FANWALL**

No. 323. Lietz Recording Rain Gauge, with Recorder No. 357; with Duplex Clock for interchangeable time scale, weekly and daily; with 12" copper float and counterpoise, copper cable, one bottle of instrument oil, one bottle recording ink and 10 charts of record paper.
..... Code Word, **FANWING**

EXTRA CHARTS FOR LIETZ RAINFALL RECORDER

Per 100

No. 358A. Daily Chart..... Code Word, **FLEBY**

No. 358AW. Daily Chart printed on waterproof paper.
..... Code Word, **FLEBRO**

No. 359A. Weekly Chart..... Code Word, **FLEBEL**

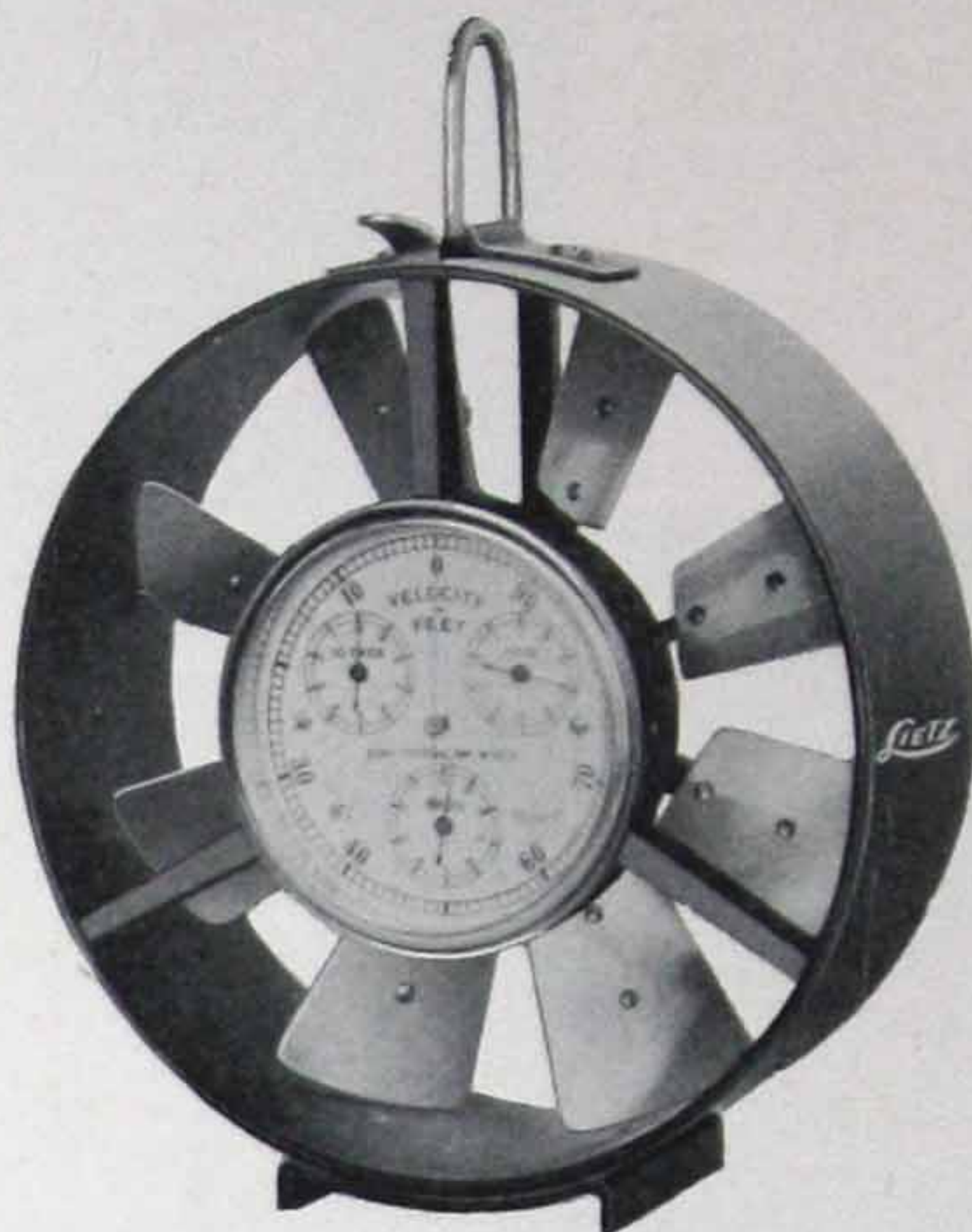
No. 359AW. Weekly Chart printed on waterproof paper.
..... Code Word, **FLEBIN**

SEE PRICE LIST IN BACK OF CATALOG

JEWELLED ANEMOMETERS



No. 332



No. 334A

Code Word

- No. 332.** Portable Airmeter. Four dials to 100,000 feet registration; $2\frac{3}{4}$ "-diameter fan; jeweled movement; disconnect and automatic zero-setting attachment; universal socket. Minimum velocity 200 feet per minute; maximum velocity 3000 feet. In leather case, with correction chart. **FAWN**
- No. 334.** Biram's Anemometer. Frame 3" diameter; two dials to 1000 feet registration; jeweled movement; disconnect and zero-setting attachment. Minimum 100 feet per minute; maximum 1000 feet per minute. With certificate, in leather carrying case. **FECULA**
- No. 334A.** Biram's Anemometer. With three dials reading to 10,000 feet; 4" diameter; jeweled movement; disconnect; automatic zero-setting attachment; in carrying case, with corrections for use from 200 to 3000 feet per minute. **FELINE**
- No. 334B.** High-speed Anemometer. Diameter $4\frac{1}{2}$ "; three dials reading to 200,000 feet; minimum speed 1000 feet per minute and maximum speed 10,000 feet; jeweled movement; disconnect; zero-setting attachment. In leather case with correction chart. **FELLY**
- No. 334C.** 4" Low Reading Anemometer. One dial reading to 50 feet; for velocities from 30 to 300 feet per minute. jeweled movement. Complete in case, with correction chart. **FELMA**

Extra Leather Cases for Above

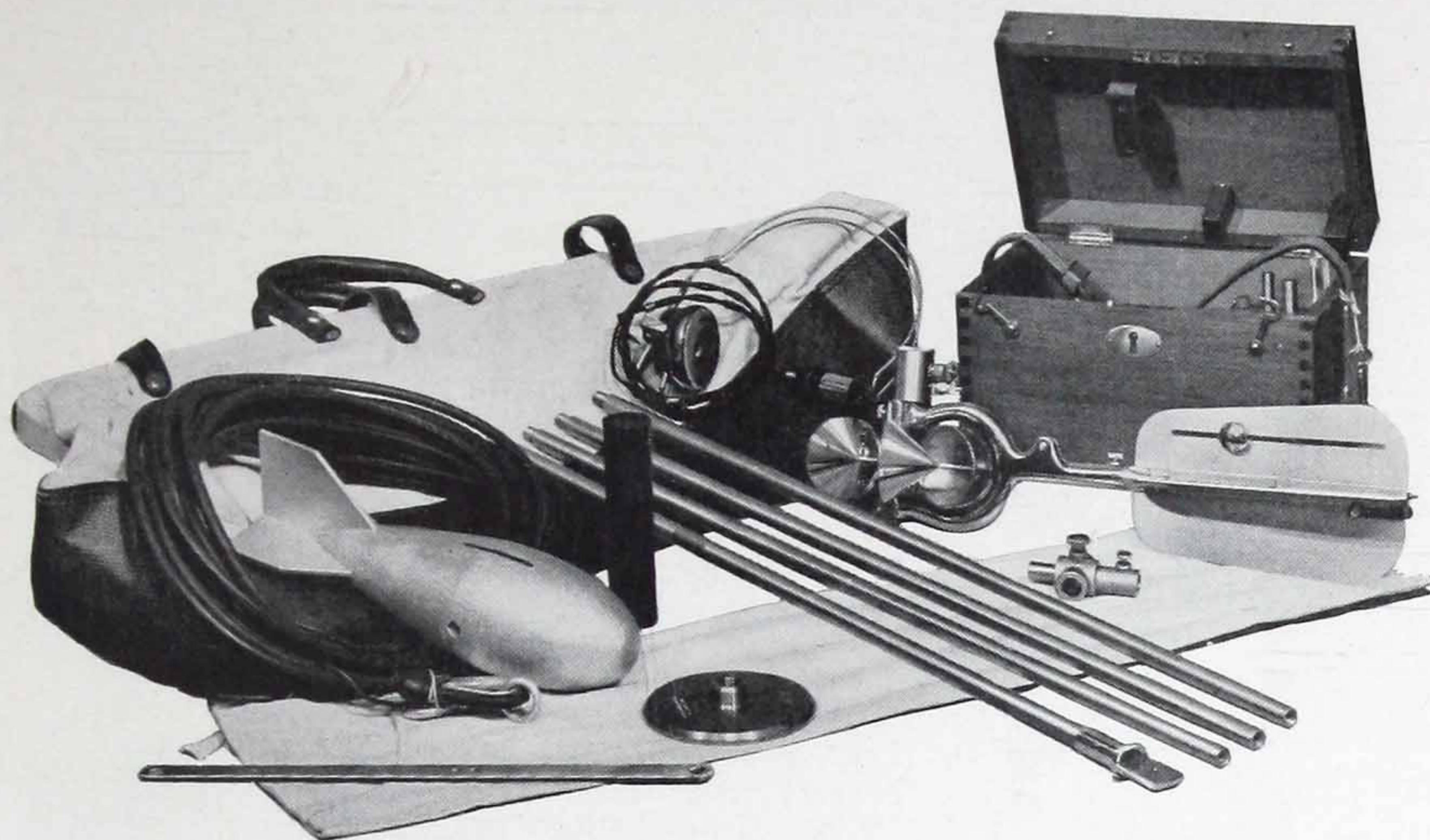
- No. 335.** Extra Leather Case for No. 334.
- No. 335A.** Extra Leather Case for No. 334A or No. 334B.

Note—Above instruments are tested and calibrated, but are not guaranteed correct when used in temperature over 300° F.

SEE PRICE LIST IN BACK OF CATALOG.

LIETZ IMPROVED CURRENT METERS

U. S. Geological Survey Specifications



The new Lietz Current Meters are made after the specifications of the U. S. Geological Survey. Backed by our many years experience in the construction of these instruments, and constant study and observation under the most severe conditions, we are proud to offer this greatly improved Lietz Current Meter, made after the original Price Pattern. The improvements consist of a newly designed yoke, tailpiece of a 2-piece construction so that it can be taken apart for packing, pivot made of hardened and tempered tool steel. The meters will rate at lower velocity and retain rating longer at all velocities. One contact chamber, indicating each revolution, or each fifth revolution of the bucket wheel, with only one rating. The meters are made more durable and of better balanced parts, simple in design, permitting easy access for cleaning of all parts. Supported at one point for either cable or rod suspension, and furnished with new streamlined lead weights, offering low resistance to stream flow. Meters are packed in small mahogany carrying case, with canvas bag for the accessories.

INDIVIDUAL CALIBRATED RATING TABLES

We aim to carry in stock at all times a number of Lietz Current Meters which have been individually rated by the United States Bureau of Standards in Washington, D. C. We also have local facilities for furnishing individual rating tables for Current Meters, either new or old. An extra charge is made covering the fee of the Bureau and the cost of preparing these rating tables, plus express charges. When ordering please indicate which of the following rating tables are desired:

- U. S. Bureau of Standards Individual calibrated Rating Table
for Rod Suspension only.....Code Word, **FIRKILE**
- U. S. Bureau of Standards Individual calibrated Rating Table
for Cable Suspension only.....Code Word, **FIRKIPA**
- U. S. Bureau of Standards Individual calibrated Rating Table
for Rod and Cable Suspension.....Code Word, **FIRKIN**
- Local Individual calibrated Rating Table for Rod and Cable
Suspension.....Code Word, **FIRKITO**

SEE PRICE LIST IN BACK OF CATALOG

LIETZ IMPROVED CURRENT METER

United States Geological Survey Specifications

No. 347A. Outfit for Cable Suspension.

The cable method of suspension is used when taking stream flow measurements from an overhead cable-way or bridge.

This Outfit consists of:

Lietz Improved Current Meter as described on page 111 with one contact chamber, indicating each revolution, or each fifth revolution of the bucket wheel, latest U. S. G. S. Specifications.

Suspension Cable. 35 ft. rubber covered, waterproof cable with hook, contact plugs, and binding post connector. Weight hanger with holes to carry meter in three positions.

Telephone Set. Receiver with flexible headband, dry battery with holder and flexible wires with double contact socket connector.

Lead Weight. New streamline model 15 lb. lead weight.

Accessories and Spare Parts. Can of instrument oil, screw driver, extra pivot with adjusting nut and lock screw, weight hanger screws, hard rubber bushing, wading rod adapter.

Mahogany Case. Compact size to hold meter with tail vanes demounted, spare parts, accessories and telephone set.

Equipment Bag. Made of heavy canvas with handles to hold Suspension Cable, Lead Weight and equipment.

No. 347A. Outfit Complete.

.....Code Word, **FISHMONT**

WADING ROD SET FOR ABOVE METER

No. 346P. **Wading Rod Set.** Four lengths of $\frac{1}{2}$ inch nickel plated brass tubing, graduated to 0.1 foot, consisting of three lengths of 2 ft. each and one length $22\frac{1}{2}$ inches. These all screw together with flush joints. The short lower length connects to the meter and all measurements read from the plane of the bucket wheel. Double-end hanger, wading base, screw binding post for upper ends of rods, insulated copper wire and spring clips for attaching wire to rods. All contained in canvas case.

.....Code Word, **FIRTIE**

SEE PRICE LIST IN BACK OF CATALOG



No. 347A

LIETZ IMPROVED CURRENT METER

United States Geological Survey Specifications

No. 347B Outfit for Rod Suspension.

There are two methods of rod suspension for Lietz Current Meter. One method is by means of the rod adopter (See illustration A). When it is desirable to rest the rod on the bottom of the stream the meter is connected to the double-end hanger. This slides along the wading rods and the meter can be clamped to any desired depth. The wading base is attached to bottom of rods. (See illustration B).

This Outfit consists of:

Lietz Improved Current Meter as described on page 111 with one contact chamber, indicating each revolution, or each fifth revolution of the bucket wheel, latest U. S. G. S. Specifications.

Wading Set No. 346P. Four lengths of $\frac{1}{2}$ inch nickel plated brass tubing, graduated to 0.1 foot, in four sections which screw together with flush joints. Rod adopter with clamping nut and double-end hanger and wading base. All measurements read from plane of bucket wheel. Screw binding post for upper end of rods, insulated copper wire and spring clips for attaching wire to rods. All contained in canvas case.

Telephone Set. Receiver with flexible headband, dry battery with holder and flexible wires with double contact socket connector.

Accessories and Spare Parts. Can of instrument oil, screw driver, extra pivot with adjusting nut and lock screw, weight hanger screw, weight pin, hard rubber bushing, wading rod adopter.

Mahogany Case. Compact size to hold meter with tail vanes demounted, spare parts, accessories and telephone set.

Equipment Bag. Made of heavy canvas with handles to hold Meter in Case, Wading Rods Set and Equipment.

No. 347B Outfit Complete.

Code Word **FISHMOUTH**

For Extra Parts See Page 114.

SEE PRICE LIST IN BACK OF CATALOG



Illustration A

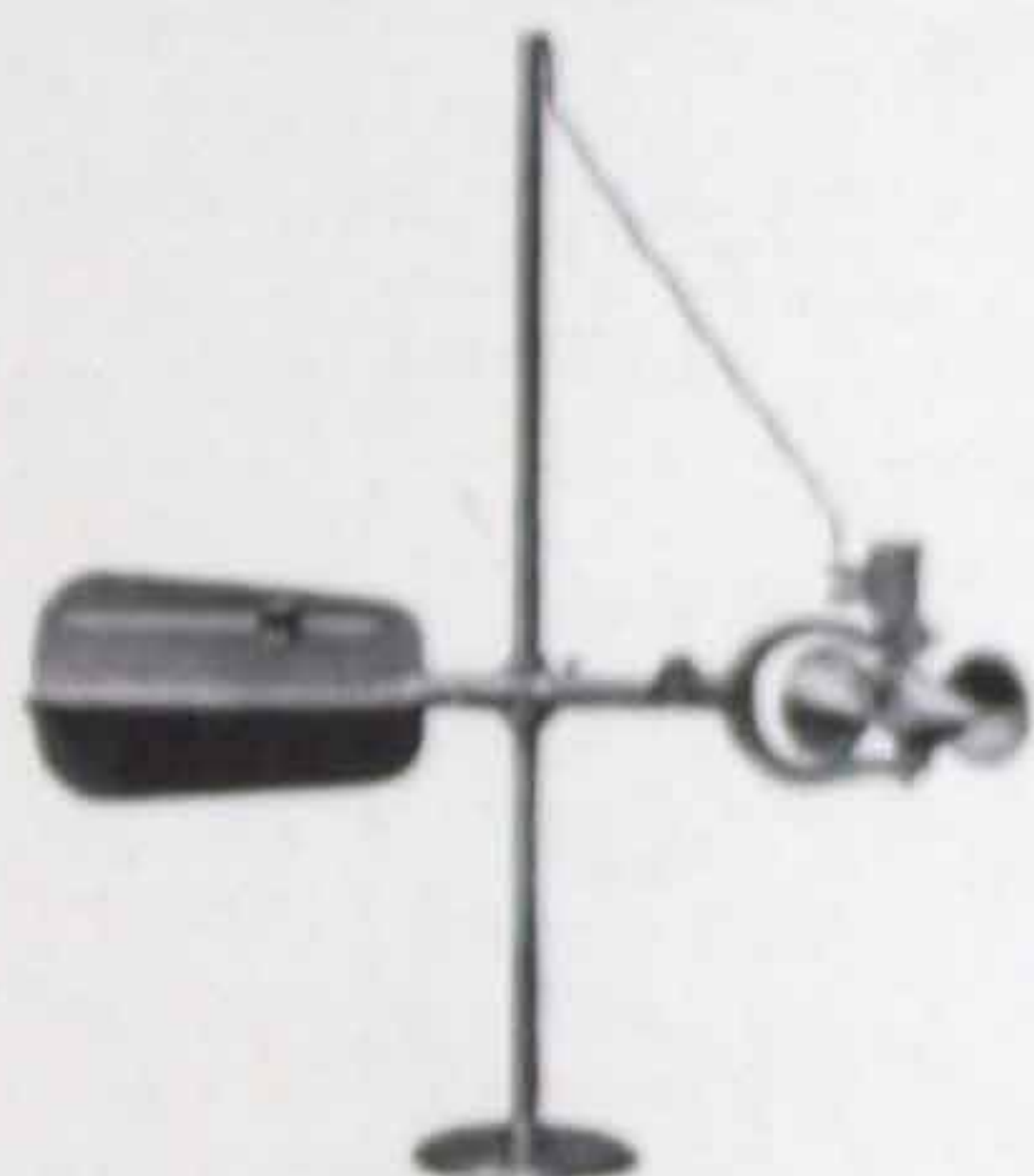


Illustration B
No. 347B



Current Meter
in Box

LIETZ CURRENT METERS

For Shallow-Stream Measurement



No. 348. Electric Current Meter indicating each revolution of the bucket wheel. Including telephone sounder with dry battery, 20 feet of cable and rods. All conveniently packed in mahogany carrying case and canvas bag for rods, including all the essential accessories.

Code Word, **FISSURE**

EXTRA PARTS FOR CURRENT METERS

		Code Word
No. 346A.	Extra Cable, per foot.....	FISSAW
No. 346B.	Extra Lead Weight, new style 15 lbs.....	FISSION
	Extra Lead Weight, new style 30 lbs.....	FISSIR
	Extra Lead Weight, new style 50 lbs.....	FISSITA
	Extra Lead Weight, new style 75 lbs.....	FISSIVO
No. 346E.	Socket Cable Connection.....	FISSOD
No. 346J	Telephone Receiver without head band.....	FIST
No. 346JJ.	Flexible Head Band for Receiver.....	FISTAN
No. 346K.	Battery complete with holder.....	FITCH
No. 346KK.	Battery only to fit holder.....	FITTER
No. 346L	Telephone Receiver cord with connections.....	FITELL
No. 346M.	Screwdriver and Wrench.....	FITILE
No. 346N.	Oil Can.....	FITINO
No. 346P.	Wading Rod Set complete in Canvas case.....	FIRTIE
No. 346PP.	Separate Wading Rod Section 2 ft. long.....	FIRTO
No. 346R.	Wading Base to fit lower section of rod.....	FISHERY
No. 346S.	Double-end Hanger used with Wading Rods.....	FISHJOINT
No. 346SS.	Adapter for Wading Rod.....	FISHPOOL
No. 346T.	Canvas Case for Wading Rod Outfit.....	FISHBIRD
No. 346TT.	Extra Canvas Equipment Bag.....	FITTAP
No. 346U	Cable complete with hook, contact plugs but with- out Telephone receiver or head band.....	FITTY
No. 346V.	Steel wire cable complete 10 ft. long.....	FIXAL
No. 346W.	Weight hanger with holes to carry meter in three positions.....	FIXER

SEE PRICE LIST IN BACK OF CATALOG

STOP WATCHES



No. 350



No. 351

- No. 350.** Stop Watch. Fine jeweled movement, nickel case, 30 minute register by $1/5$ seconds. Start, stop and fly-back from crown, side push for the split second hand*. **FIXITY**

Code Word

*The split-second Stop Watch enables one to take two separate records at one time.

- No. 351.** Stop Watch. Fine jeweled movement in nickel case, 30 minute register by $1/5$ seconds. Start, stop and fly-back from crown. **FLAGMAN**

- No. 351T.** Same as No. 351 but with "time out" feature. Side slide starts and stops hand. Pressure on crown brings hand back to zero. **FLANTUN**



No. 351A



No. 353

- No. 351A.** Decimal Timer. This divides the minute into one hundred parts. Fine jeweled movement in nickel case. Small hand registers revolutions of long hand. Fly-back from crown. Side slide for "time out". **FLAMBAGE**

Code Word

- No. 353.** Stop Watch Chronograph. Fine jeweled movement, nickel case. A regular pocket watch and $1/5$ second watch combined. Start, stop and fly-back from crown. **FLAMINGO**

- No. 353S.** Similar to No. 353 but ordinary quality. **FLAMIST**

SEE PRICE LIST IN BACK OF CATALOG

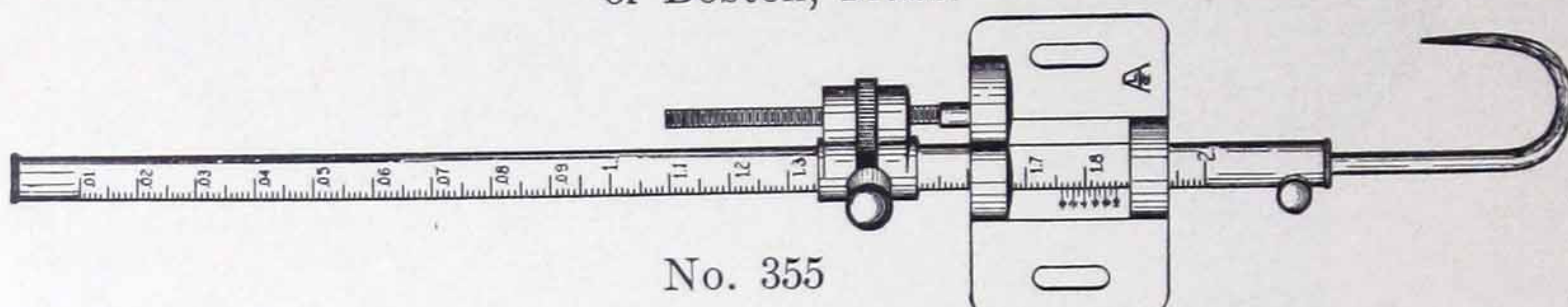
STREAM FLOW RECORD SHEETS

- No. 349.** Sheets $8\frac{1}{2} \times 11$ inches, punched for three-ring binder with various columns and headings for recording stream-measurement record.
per 100 sheets.....Code Word, **FIZZ**
- No. 349A.** Three-Ring Binder, stiff cover, black morocco finish, $11\frac{1}{2} \times 9\frac{1}{2}$ inches, for stream-flow record sheets. Each...Code Word, **FIZZLE**

IMPROVED HOOK GAUGE

Entirely of Metal—Nickel-Plated

Made after suggestions of Messrs. Metcalf & Eddy, Consulting Engineers,
of Boston, Mass.

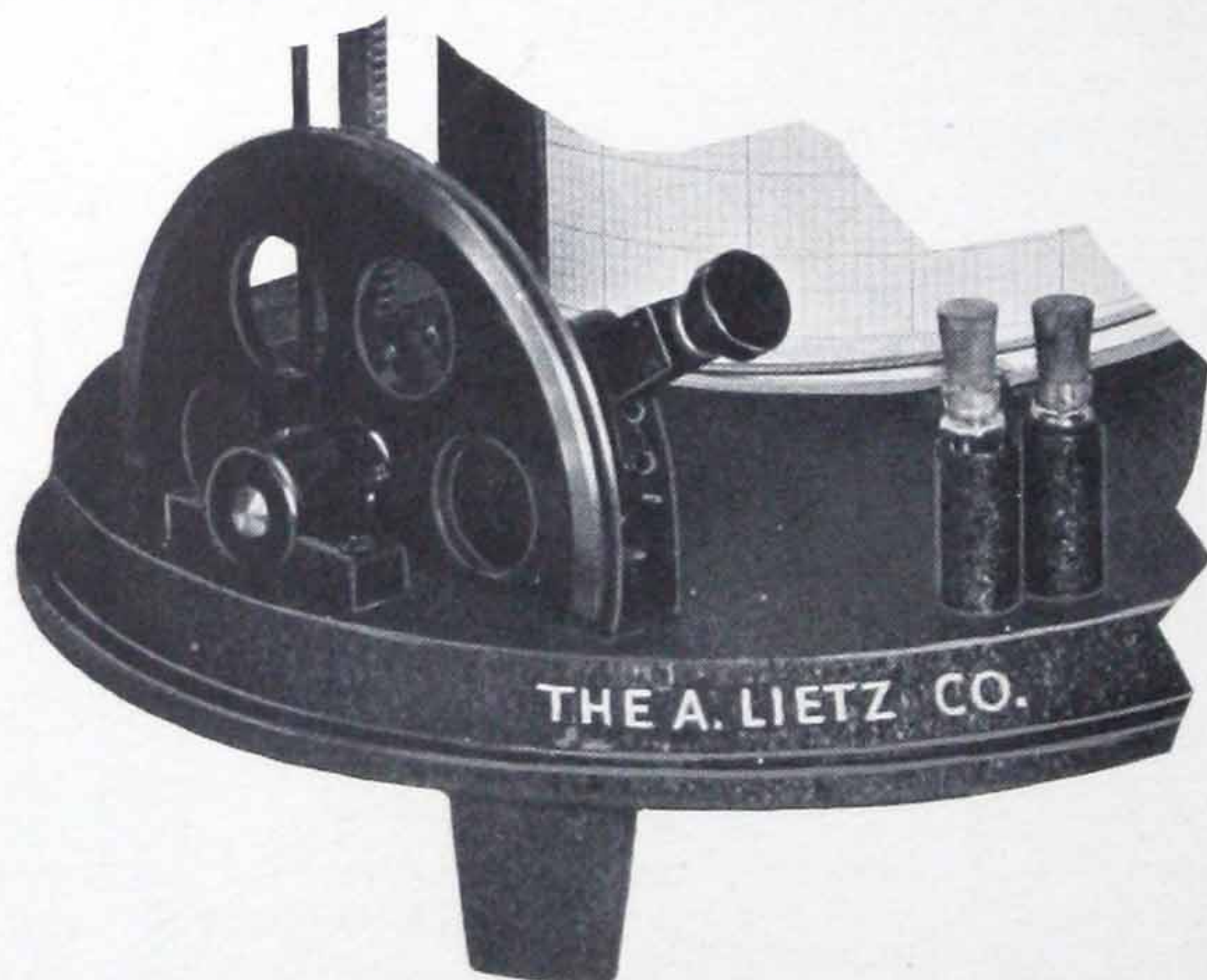


No. 355

- No. 355.** Improved Hook Gauge, made entirely of metal, nickel-plated. Tube two feet long, graduated to feet, 10ths and 100ths, with vernier reading to 1000ths. The hook may be extended 12 inches from within the tube, permitting it to be set to the exact level of the water. Metal plate with holes for attaching gauge to side of flume.
.....Code Word, **FLIRTON**

Improved Metal Hook Gauges like No. 355, but with longer tubes, can be made on special order. Prices on application.

LIETZ VERTICAL WATER STAGE RECORDERS



EXCLUSIVE FEATURES

Lietz Multi-Ratio
Gear Arrangement

Lietz Duplex Clock
Time Arrangement.

Illustrating Lietz Multi-Ratio Gear arrangement.
Any one of three different gear ratios instantaneously
obtained by merely shifting the gear lever.

After many years of experimental work in the laboratory and in the field, we have developed an improved type of Vertical Water Stage Recorder. Simplified construction and new developments have made possible this superior instrument.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ VERTICAL WATER STAGE RECORDERS

THE RECORDING DRUM

The recording drum, constructed of heavy brass, is positively uniform in circumference. It is 12" high and $18\frac{1}{2}$ " in circumference. By means of an improved ball bearing suspension, friction has been reduced to a minimum.

THE CHARTS

The charts are held to the drum by two spiral stainless steel spring belts. Each chart is slotted on the lower margin and this slot fits over a lug at the base of the drum, preventing slippage and assuring that every chart is placed in exactly the same position on the drum. The engraved portion of the chart is $18\frac{1}{2}$ "x12". The vertical lines represent the time scale, and the horizontal lines represent the height of water level. The different types of charts available are listed on page 124.

THE CLOCK

The clock is a high grade jeweled movement carefully selected to insure uniformity of rate, and powerful enough to drive the recording drum from 10 to 14 days. It is appropriately mounted within the revolving drum where it is effectively sealed against moisture and dust. The two springs of the clock are wound by means of a key inserted through bushings in the top of the drum. Adjustment of the time element is accomplished through a horizontal slot in the wall of the drum. The gear arrangement is equipped with an improved friction sleeve which makes it possible to bring the point of the pen or pencil to its exact position on the chart by merely revolving the drum to the point desired. This is accomplished without either strain or damage to the gears or clock movement and is a great improvement over other methods.

Our basic clock movement is so arranged that the drum will make one complete revolution in eight days. Other arrangements, however, are also obtainable and we can furnish recorders where the drum will make one complete revolution in four days, two days, twenty-four hours or twelve hours.

LIETZ DUPLEX CLOCK

The Lietz duplex clock arrangement is a movement geared for any of the following interchangeable time scales: eight-day and four-day, eight-day and two-day, eight-day and twenty-four hours and eight-day and twelve hours. In using the Lietz duplex clock arrangement, it is only necessary to engage the proper gear to produce the time scale desired. The gear not in use is simply depressed and given a quarter turn where a pin will hold it securely out of contact. **This unique arrangement permits changing from one time scale to another instantaneously, without detaching or attaching any special gears.**

LIETZ MULTI-RATIO GEAR ARRANGEMENT

By means of a very unique gear arrangement, we are prepared to supply Lietz Vertical Water Stage Recorders geared 1:1 and 1:5 and 1:10, it being possible to obtain **all three ratios in one Register by merely shifting a small gear lever and without the need of exchanging gears.** Thus, it is possible to immediately adjust the gear ratio to conditions existing in the field.

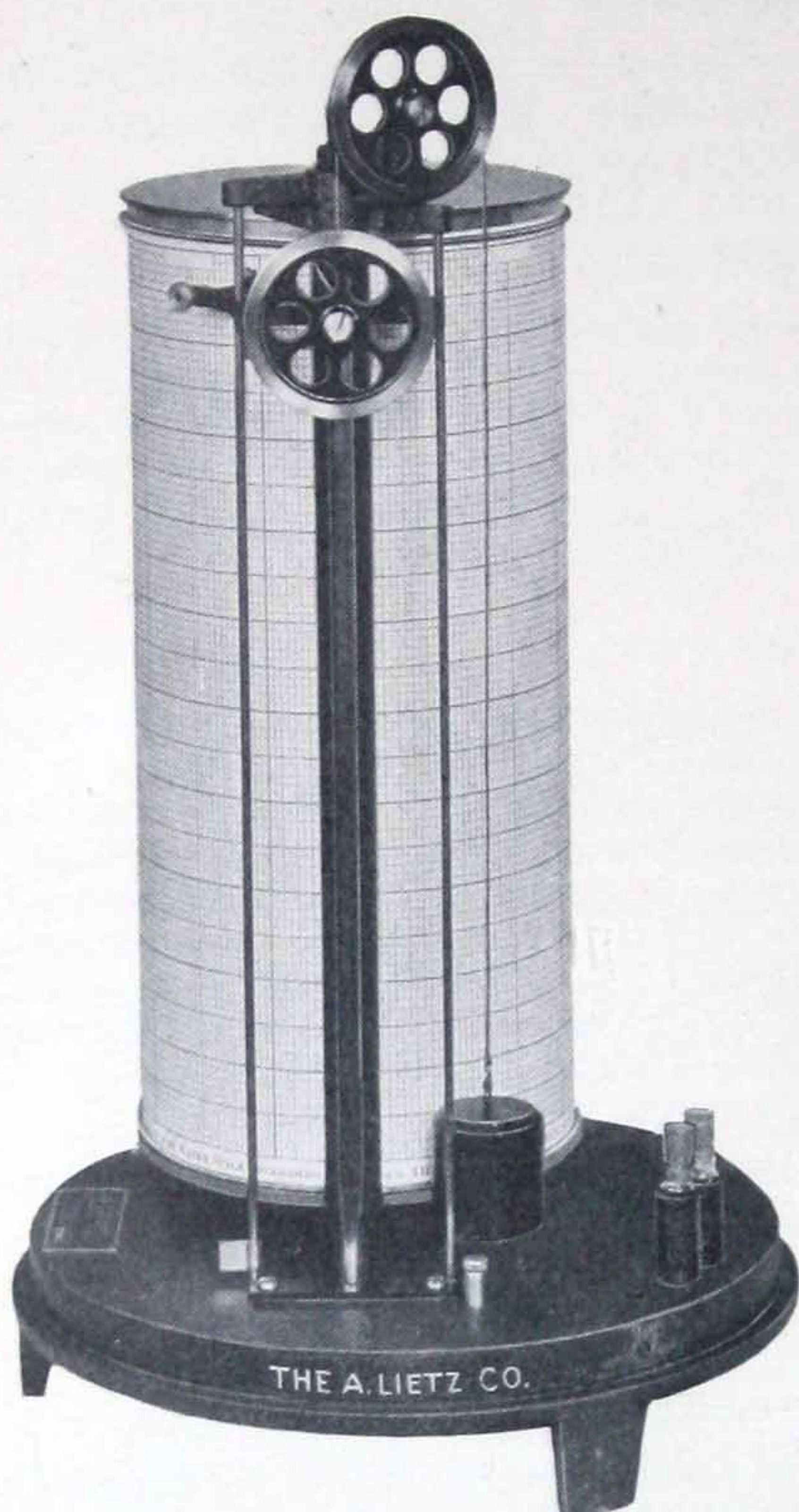
This multi-ratio arrangement makes this the universal register, and if purchased with the duplex clock above described it is possible not alone to obtain three gear ratios on one Register, but two time scales as well, all of which is accomplished by merely setting in place the proper gears which are **permanently attached.**

OTHER GEAR RATIOS

Other Registers carried in stock are geared 1:1 and 1:2, and we are prepared to furnish special instruments of any other ratio, or interchangeable ratios to order.

LIETZ VERTICAL WATER STAGE RECORDERS

Geared 1:1 and 1:2



Furnished Complete
with Galvanized Iron
Cover.
Shipping Weight
about 50 lbs.

WITH SINGLE TIME GEAR

No. 356-8D. Lietz Improved Vertical Water Stage Recorder, Drum 12" high, 18½" in circumference; clock geared to make one complete revolution in 8 days; geared 1:1 and 1:2, with 12" copper float* and counterpoise; 20 ft. of copper cable; one bottle of instrument oil, extra leads and and 10 charts of paper, complete with metal cover. Code Word, **FLAMA**

Code Word

- | | | |
|---------------------|---|-----------------|
| No. 356-4D. | Same as above but geared to make one complete revolution in 4 days. | FLAMABLE |
| No. 356-2D. | Same as above but geared to make one complete revolution in 2 days. | FLAMACE |
| No. 356-24H. | Same as above but geared to make one complete revolution in 24 hours. | FLAMAD |
| No. 356-12H. | Same as above but geared to make one complete revolution in 12 hours. | FLAMAFT |

WITH LIETZ DUPLEX CLOCK MOVEMENT

- | | | |
|---------------------|--|-----------------|
| No. 357-4D. | Same as No. 356-8D with Lietz Duplex Clock geared for interchangeable time scale, one complete revolution in 8 days or 4 days. | FLAMBALD |
| No. 357-2D. | Same as No. 357-4D but geared for 8 days and 2 days. | FLAMBARE |
| No. 357-24H. | Same as No. 357-4D but geared for 8 days and 24 hours. | FLAMBIX |
| No. 357-12H. | Same as No. 357-4D but geared for 8 days and 12 hours. | FLAMBIZE |

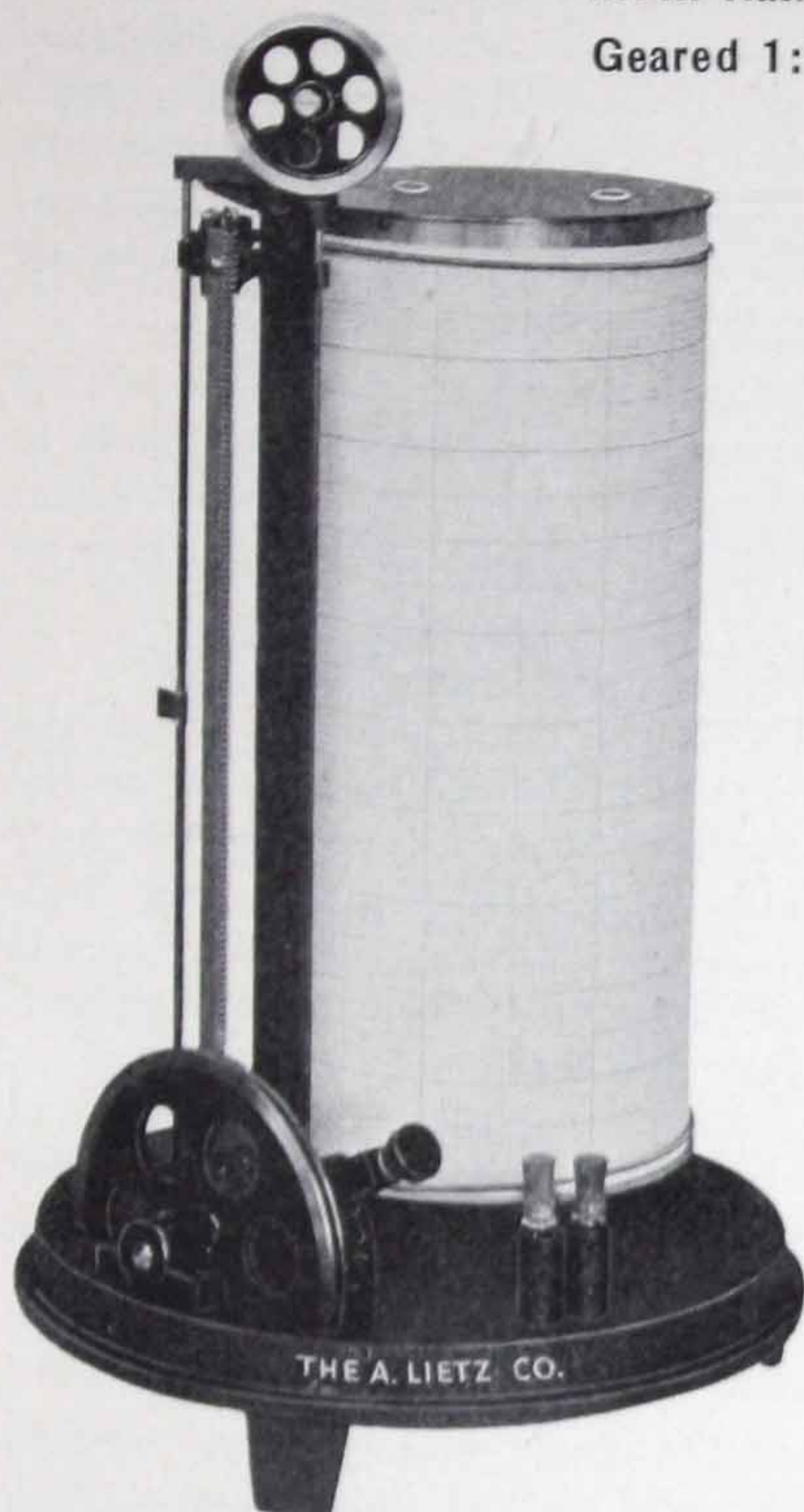
*On these recorders the counterpoise to float operates above the base plate of the instrument, permitting the use of a 12" float.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ VERTICAL WATER STAGE RECORDERS

Multi-Ratio Gear Arrangement

Geared 1:1 and 1:5 and 1:10



Furnished Complete

with Galvanized Iron

Cover.

Shipping Weight

about 50 lbs.

WITH SINGLE TIME GEAR

No. 356A-8D. Lietz Multi-Ratio Vertical Water Stage Recorder, Drum 12" high, 18½" in circumference; clock geared to make one complete revolution in 8 days; Lietz patent gear arrangement for 1:1 and 1:5 and 1:10 ratio; with 7" copper float* and counterpoise; 20 ft. of copper cable; one bottle of instrument oil; extra leads and 10 charts of paper, complete with metal cover.

.....Code Word, **FLAMER**

Code Word

- | | | |
|----------------------|---|-----------------|
| No. 356A-4D | Same as above but geared to make one complete revolution in 4 days..... | FLAMESH |
| No. 356A-2D. | Same as above but geared to make one complete revolution in 2 days..... | FLAMETER |
| No. 356A-24H. | Same as above but geared to make one complete revolution in 24 hours..... | FLAMETY |
| No. 356A-12H. | Same as above but geared to make one complete revolution in 12 hours..... | FLAMEZE |

WITH LIETZ DUPLEX CLOCK MOVEMENT

- | | | |
|----------------------|---|-----------------|
| No. 357A-4D. | Same as No. 356A-8D with Lietz Duplex Clock geared for interchangeable time scale, one complete revolution in 8 days or 4 days..... | FLAMIACK |
| No. 357A-2D. | Same as No. 357A-4D but geared for 8 days and 2 days..... | FLAMIDER |
| No. 357A-24H. | Same as No. 357A-4D but geared for 8 days and 24 hours..... | FLAMIST |
| No. 357A-12H. | Same as No. 357A-4D but geared for 8 days and 12 hours..... | FLAMITE |

*On these recorders, when using gear ratio 1:5 and 1:10 the counterpoise to float operates under the base plate of the instrument and must at times pass the float, therefore a 7" float is used.

EXTRA CHARTS AND ACCESSORIES

For Extra Charts and Accessories for the above instruments, see page 124.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ HORIZONTAL WATER STAGE RECORDERS

The Lietz Horizontal Water Stage Recorder, for automatically recording the rise and fall of water in reservoirs, lakes, canals, weirs, etc., was originally designed and manufactured by us for the U. S. Department of Agriculture over twenty years ago, and has found wide application. Its simplicity of construction, together with efficiency and moderate price, has created its popularity. We have made improvements from time to time, which have increased its efficiency, and the Recorder as made by us today constitutes the best moderate price device on the market.

The customary ratios which we supply and aim to keep in stock are 1:1, 1:2, 1:5 and 1:10, also a device whereby the pencil movement can be changed and made to travel over the drum in a period of either 1 or 8 days. (See Lietz Duplex Time Water Stage Recorder.) Any other ratio, as well as interchangeable ratios, can also be supplied.

OPERATION

The principle of construction of the Lietz Horizontal Recorder is such that the clock is not made to perform a labor which it was not intended to perform by the manufacturer. The clock movements used in Lietz Recorders have been carefully selected and have jewel bearings to assure uniformity of rate. On the Lietz Horizontal Recorder the clock merely releases a chain to which the pencil carriage is attached. This pencil carriage is drawn across the drum by means of a small weight. The drum is controlled by the float which rests on the surface of the water. This design and simple construction permits of easy operation and assures an accurate and uninterrupted record. The record sheets are easily attached to the drum, both ends being inserted in a narrow slot and fit snugly around the drum. The sheets are of a convenient size so that they may be filed and handled with ease.

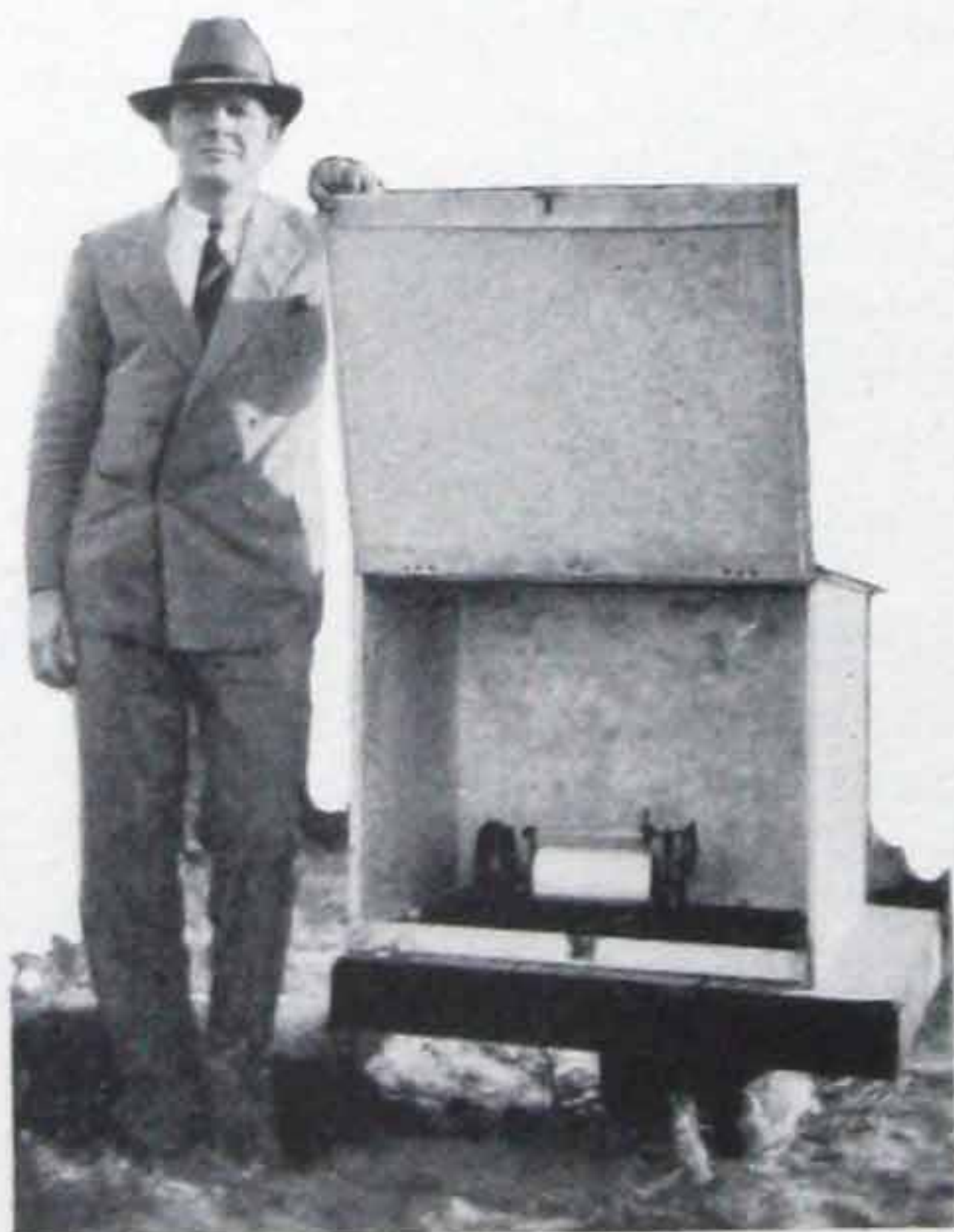
INSTALLATION

When Lietz Recorders are shipped, we insert a small strip of paper through the escapement wheel in order to prevent motion and wear during transportation. This piece of paper will first have to be removed. It will be found directly under the cap on the top of the clock case. The pencil carriage chain is then wound around the cylinder on the outside of the clock case. This is manipulated by moving the ratchet wheel with the finger. **Care should be taken that the chain is**

reeled on evenly, one layer only. This is necessary to assure a uniform time record. The pencil carriage is secured to this chain by a small plate and thumb screw and may be adjusted to its proper place on the drum according to the days marked thereon. The chain weight is then attached. This is for the purpose of giving the proper tension; and as the clock releases the chain, this weight helps draw it with the pencil carriage across the drum. The guide rods for the pencil carriage should be kept clean, so as to afford free movement.

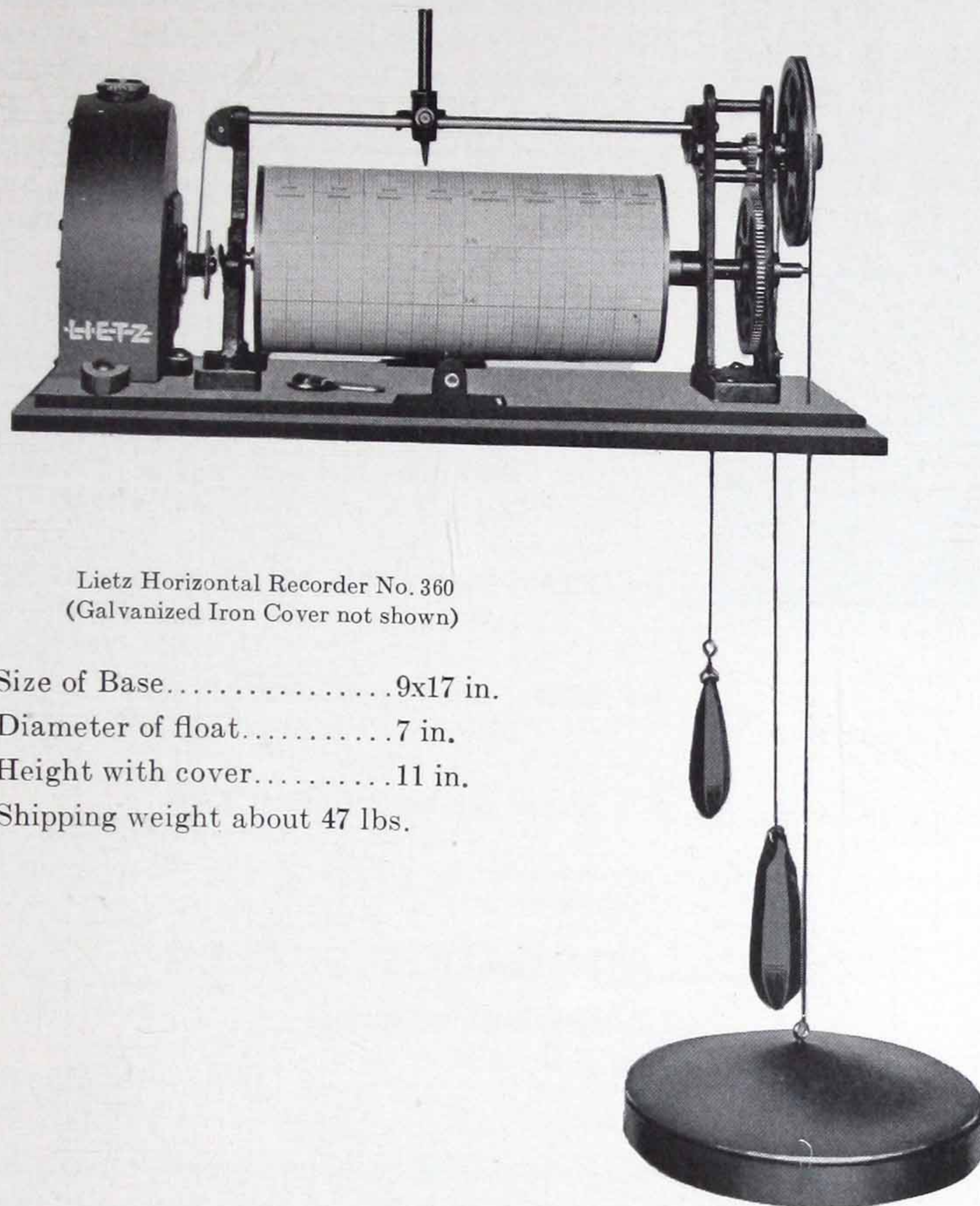
Details of installation depend largely upon local conditions. It is generally necessary to provide a box or tube, smooth internally and of sufficient size to allow a free movement of the float.

For the successful operation of mechanical devices, it is necessary that the patrolman or caretaker familiarize himself thoroughly with their peculiarities.



LIETZ HORIZONTAL WATER STAGE RECORDERS

As made by us for the U. S. Department of Agriculture



Lietz Horizontal Recorder No. 360
(Galvanized Iron Cover not shown)

Size of Base.....9x17 in.
Diameter of float.....7 in.
Height with cover.....11 in.
Shipping weight about 47 lbs.

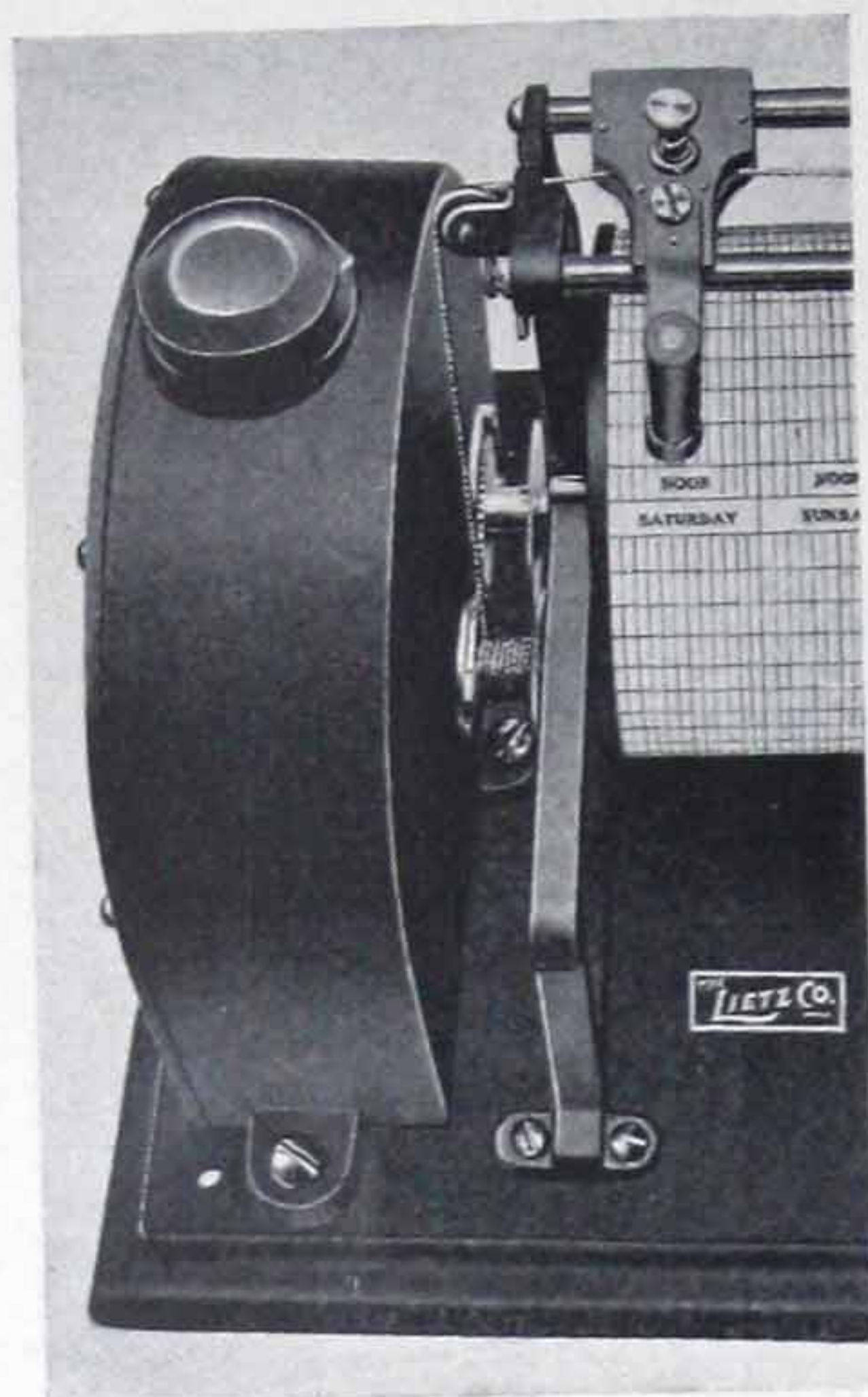
- No. 360.** Lietz Standard Horizontal Water Stage Recorder with 12-inch drum, high-grade 8-day clock movement, complete with float, weights and strong galvanized iron hood, 10 Record Sheets, and directions for installation, gear 1:1.....Code Word, **FLANKER**
- No. 360A.** Same as No. 360, but geared for both 1:1 and 1:2.
.....Code Word, **FLASHING**
- No. 360B.** Same as No. 360, but geared for both 1:1 and 1:5.
.....Code Word, **FLEXOR**
- No. 360C.** Same as No. 360, but geared for both 1:1 and 1:10.
.....Code Word, **FLINCH**
Any other ratio can be supplied on special order.

EXTRA CHARTS AND ACCESSORIES

For extra Charts and Accessories for the above instruments, see page 124.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ DUPLEX TIME HORIZONTAL RECORDERS



The Lietz Duplex Time Recorders are a modification of our No. 360 Water Recorders. By means of attaching an extra gear and reel to the clockworks, the pencil can be made to travel across the drum in a period of either one or eight days. Either result may be obtained as conditions necessitate, by winding the chain, which releases the pencil, on the proper reel.

No. 362. Lietz Duplex Time Recorder, with 12-inch drum, high-grade 8-day clock movement, complete with float, weights and strong galvanized iron hood, 10 record sheets, and directions for installation. Geared 1:1.
.....Code Word, **FLINDER**

No. 362A. Same as No. 362, but geared for both 1:1 and 1:2..Code Word, **FLIPPER**

No. 362B. Same as No. 362, but geared for both 1:1 and 1:5..Code Word, **FLOCKER**

No. 362
Illustration showing two reels for chain as incorporated in our Duplex Time Recorders.

No. 362C. Same as No. 362, but geared for both 1:1 and 1:10.
.....Code Word, **FLOORER**

Lietz Duplex Time Recorders can also be geared to any other desired ratio on special orders. Prices on application.

PORCELAIN GAUGE SCALES



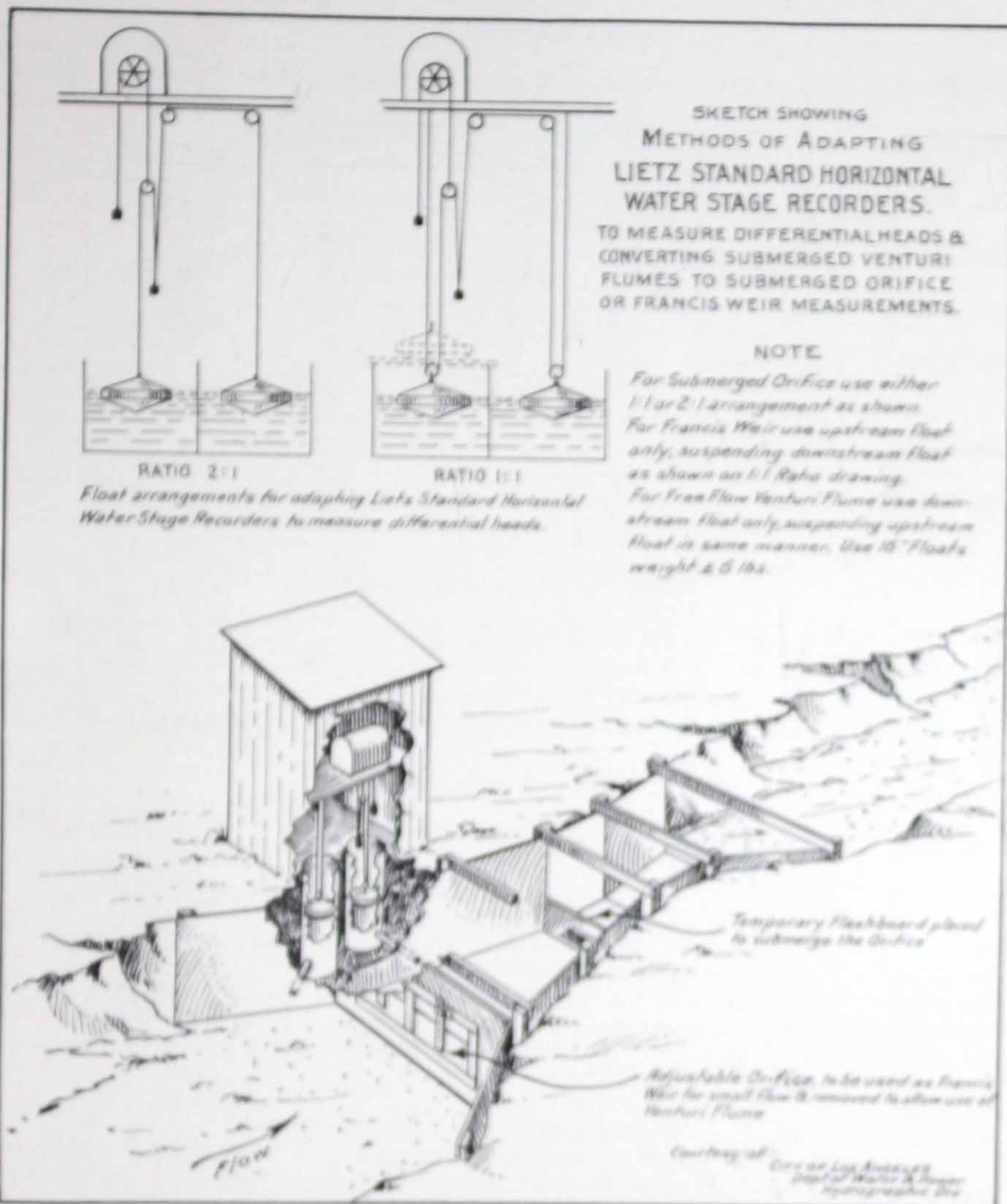
Divided to feet, 10ths and 100ths.

These Gauge Scales are made of metal strips $2\frac{1}{2}$ inches wide. They are highly enameled to prevent rusting and are made in various lengths. There is a hole every 6 inches so that the scales can be nailed or screwed in place. The figures are black on a white background and are easily read.

- | | | |
|------------------|---|----------------------------|
| No. 370A. | Porcelain Gauge Scale, 1 foot long..... | Code Word
FLOREX |
| No. 370B. | Porcelain Gauge Scale, $3\frac{1}{3}$ feet long..... | FLORIA |
| No. 370C. | Porcelain Gauge Scale, $6\frac{2}{3}$ feet long, in two $3\frac{1}{3}$ foot sections..... | FLORIDAN |
| No. 370D. | Porcelain Gauge Scale, 10 feet long, in three $3\frac{1}{3}$ foot sections..... | FLORIMER |

Gauge Scales of other lengths and special graduations can be made to order.

SEE PRICE LIST IN BACK OF CATALOG



TIDE GAUGE PAPER

No. 368. Record Paper for Recording Tide Gauge, in rolls 13
inches wide and 22 yards long. Per roll.....

Code Word

FLORATO

EXTRAS FOR LIETZ WATER STAGE RECORDERS

Charts for Vertical Recorders

		Code Word	Per 100
No. 358.	Daily Chart for Vertical Recorders divided in 10ths and 100ths of a foot.....	FLEBOC	
No. 358W.	Daily Chart for Vertical Recorders divided in 10ths and 100ths of a foot, printed on waterproof paper....	FLEBUD	
No. 358A.	Daily Chart for Vertical Recorders divided in inches and 10ths.....	FLEBY	
No. 358AW.	Daily Chart for Vertical Recorders divided in inches and 10ths, printed on waterproof paper.....	FLEBRO	
No. 359.	Weekly Chart for Vertical Recorders graduated to 10ths and 100ths of a foot.....	FLEATON	
No. 359W.	Weekly Chart for Vertical Recorders graduated to 10ths and 100ths of a foot, printed on waterproof paper.....	FLEBAR	
No. 359A.	Weekly Chart for Vertical Recorders graduated to inches and 10ths.....	FLEBEL	
No. 359AW.	Weekly Chart for Vertical Recorders graduated to inches and 10ths, printed on waterproof paper.....	FLEBIN	

Charts for Horizontal Recorders

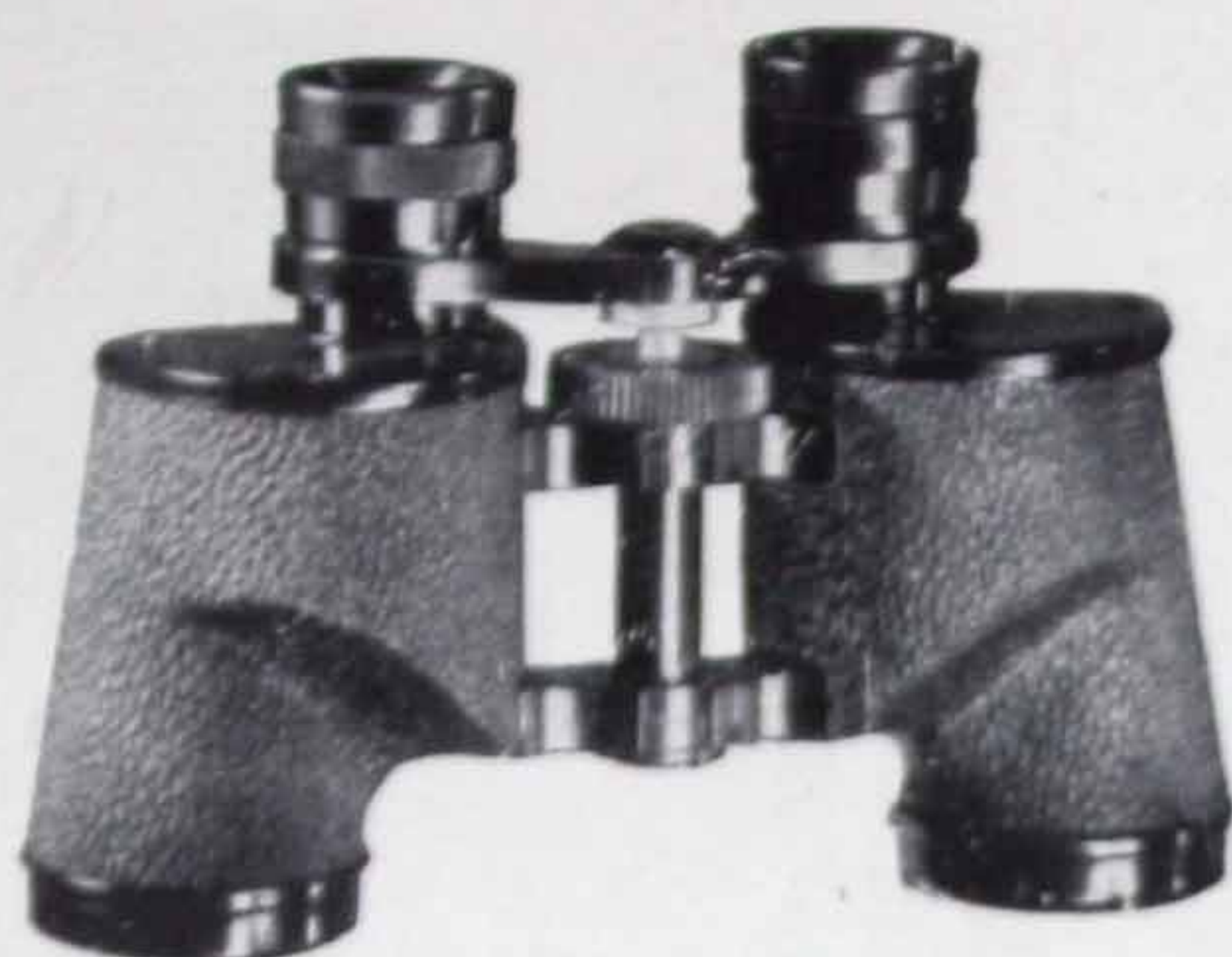
		Code Word
No. 365A.	Weekly Chart for Horizontal Recorders.....	FLOODGATE
No. 365AW.	Weekly Chart printed on waterproof paper.....	FLOODGO
No. 365C.	Daily Chart for Horizontal Recorders.....	FLOODTIDE
No. 365CW.	Daily Chart printed on waterproof paper.....	FLOODTIP

Parts and Accessories

		Code Word	Each
No. 365E.	Extra Float 7".....	FLOODMAN	
	Extra Float 12".....	FLECK	
	Extra Float 14".....	FLEDER	
	Extra Float 16".....	FLEDOL	
No. 365F.	Cap for Clock Case (Horizontal Recorder).....	FLOODCAP	
No. 358G.	Counter Weight for Vertical Recorder.....	FLEECE	
No. 365G.	Counter Weight for Horizontal Recorder.....	FLOODER	
No. 358H.	Spiral Stainless Steel Spring Chart Belt.....	FLEEMO	
No. 365H.	Screws to Clamp Cover to Base (Horizontal Recorder).....	FLEENY	
No. 358I.	Syphon Pens.....	FLEET	
No. 358J.	Extra Clock and Drum Complete for Vertical Recorder with gear for one time scale.....	FLEGA	
No. 358K.	Extra Clock and Drum Complete for Vertical Recorder, with two gears for two interchangeable time scales.....	FLEGIN	
No. 361.	Extra Clock complete with housing for Horizontal Recorder.....	FLEGLIN	
No. 0361	Extra Clock for Horizontal Recorder without housing.....	FLEGLORE	
No. 365K.	Gold Filled Chain for Pencil carriage.....	FLEGLUX	
No. 358M.	Copper Cable for float and weight.....	FLEGRO	per yd.
No. 365L.	Extra key for clock (Horizontal Recorder).....	FLEGSACK	
No. 358L.	Extra key for clock (Vertical Recorder).....	FLEGSAD	

SEE PRICE LIST IN BACK OF CATALOG

BINOCULARS



Bausch & Lomb Stereo Prism Binoculars are known throughout the world for their clear, wide field of view, superior illumination, perfect definition of image and freedom from color fringes.

With Central Focusing Device

				Magnification	Diameter of Objective Lens	Code Word
No. 374A.	Bausch & Lomb Prism Binoculars			6×	30 m/m	JESUB
No. 374B.	"	"	"	7×	35 m/m	JAIXT
No. 374C.	"	"	"	8×	30 m/m	JESEX
No. 374D.	"	"	"	9×	35 m/m	JEVOC

INDEPENDENTLY FOCUSING EYEPIECES

Bausch & Lomb prism binoculars can be supplied with INDEPENDENTLY FOCUSING EYEPIECES at a slight difference in cost.

TRIPOD AND CLAMP FOR FIELD GLASSES



No. 385

No. 385. Adjustable clamp suitable for mounting on Metal Extension Tripod, adjustable for any Field Glass, Telescope or Prism Binocular.

.....Code Word, **FLOP**

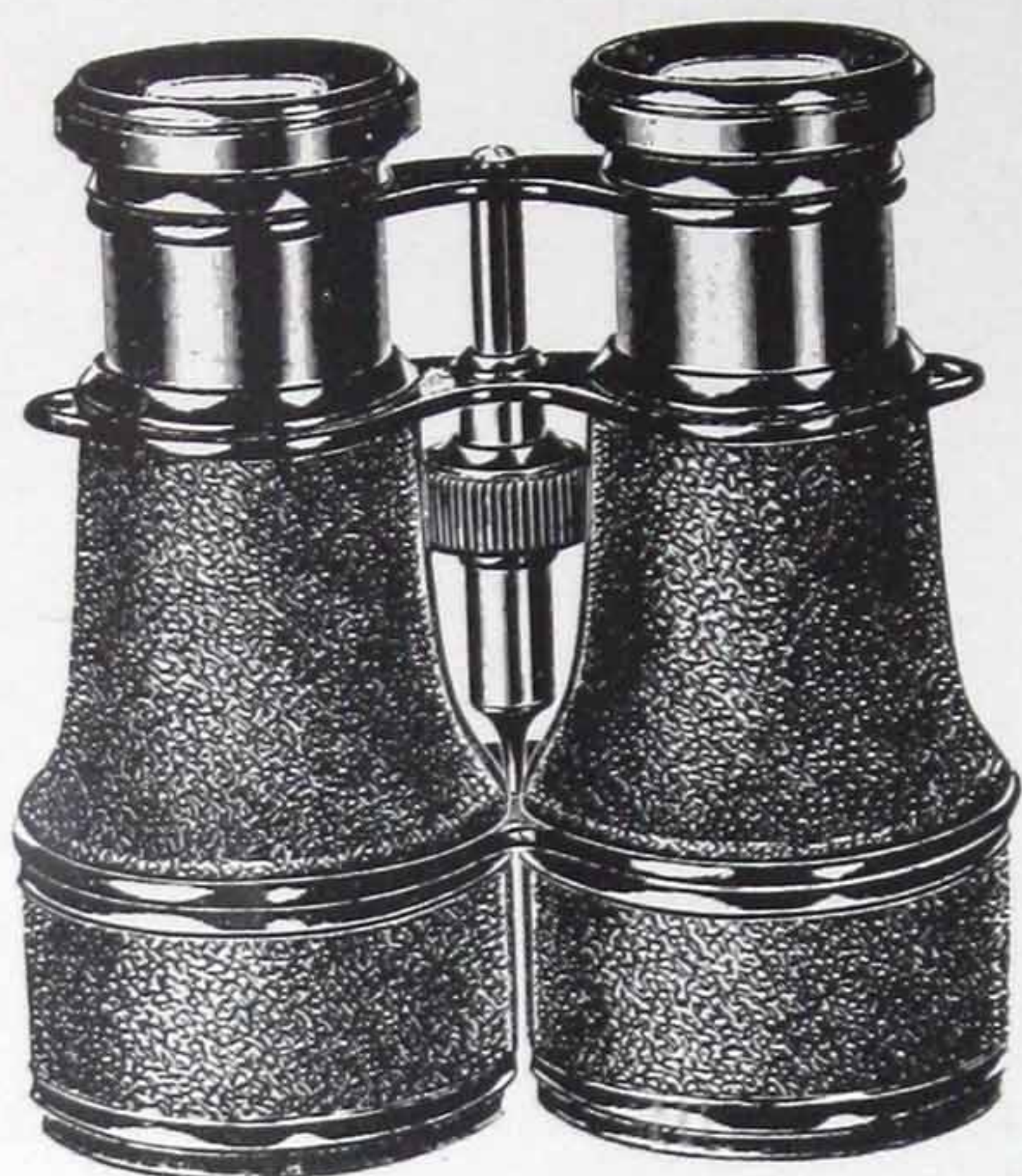
(Clamp No. 385 will fit any standard Camera Tripod)

No. 185D. Collapsible Metal Tripod for Clamp No. 385.

.....Code Word, **ELATE**

SEE PRICE LIST IN BACK OF CATALOG

FIELD GLASSES



No. 394



No. 395



No. 396

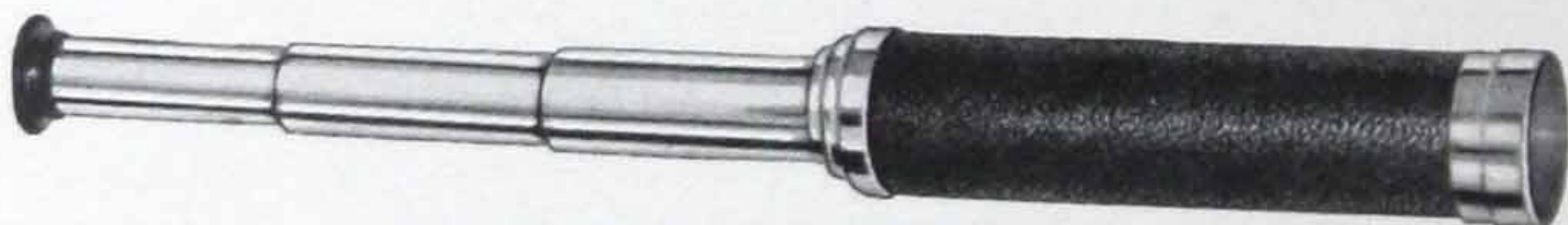
- No. 394. Marine Glass, black leather cover, fine Japanned finish in black leather case. Magnification 6X, diameter objective about 54mm.

Code Word
FLORILE
- No. 395. Sport Glass. Magnification 2X. Wide field and remarkable luminosity in neat leather case with snap.

FLORIM
- No. 396. Field Glass. Magnification 4X. An excellent glass for nature and bird study, touring and sports.

FLORIOLE

ACHROMATIC TELESCOPES



Telescopes Nos. 397 and 398 have excellent achromatic optics and cover a wide field of view with crispy sharpness and without color fringes. Draw tubes brilliantly nickerled, the body of ribbed vulcanized fibre.

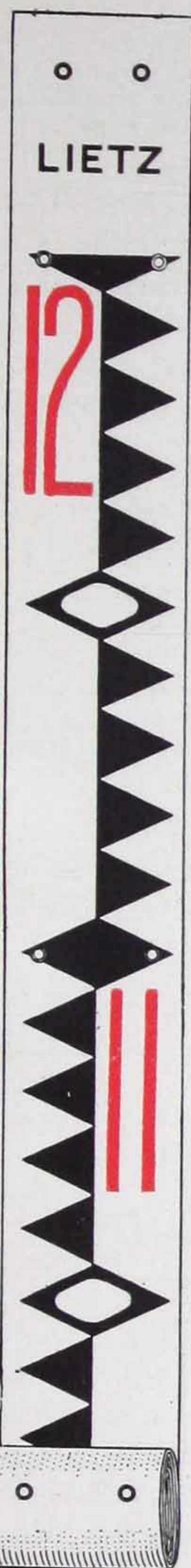
	Power	Diameter of Objective	Length Extended	Length Closed	Field at 1000 Yds.	Code Word
No. 397	8X	7/8"	9 1/4"	4 1/2"	50 yds.	FLORIP
No. 398A.	10X	7/8"	14 3/4"	5 3/8"	33 yds.	FLORISA
No. 398B.	15X	1 1/4"	18 1/2"	6 1/2"	25 yds.	FLORISADE
No. 398C.	25X	1 11/16"	30 3/4"	9"	17 yds.	FLORISAFT
No. 398D.	35X	1 15/16"	38 1/2"	10 7/8"	15 yds.	FLORISAG
No. 398E.	45X	2 1/4"	46 3/8"	12 1/2"	13 yds.	FLORISAIL

CELESTIAL EYEPIECE FOR 45 POWER TELESCOPE

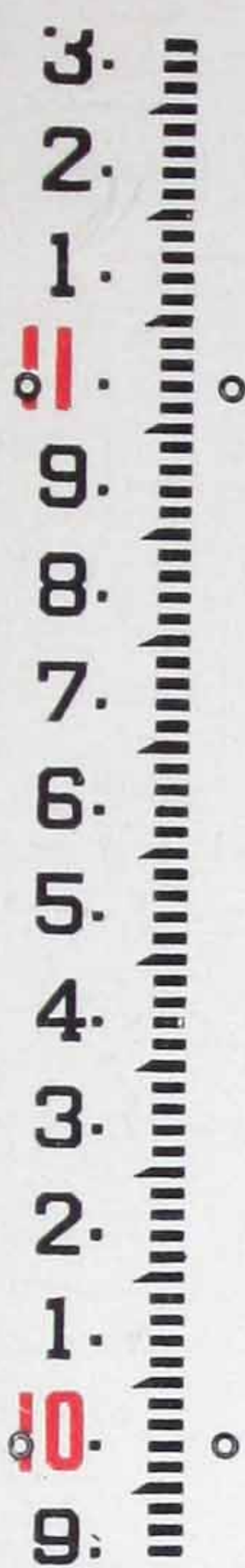
This displaces the regular eyepiece and increases the power to 68X for astronomical observations. Image inverted. With dark glass filter for solar observation.
No. 399. Celestial eyepiece for telescope No. 398E, in leather case. **FLORISANT**

SEE PRICE LIST IN BACK OF CATALOG

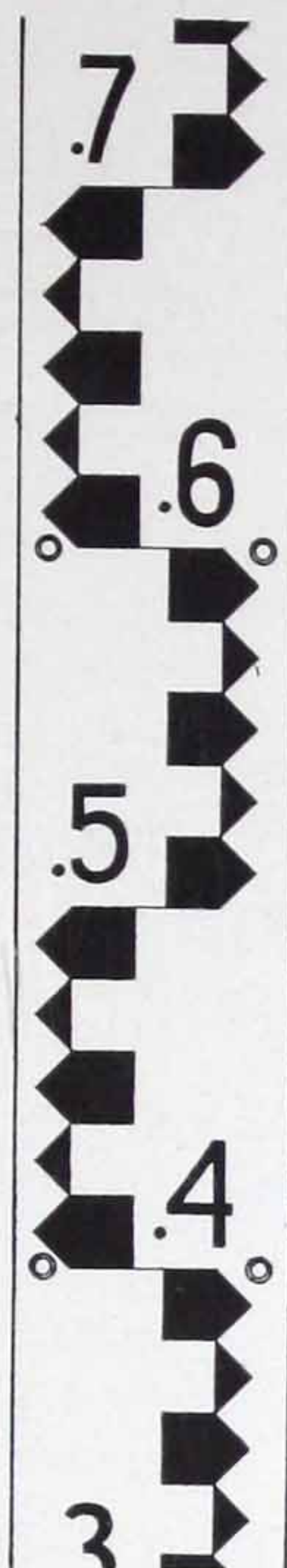
FLEXIBLE LEVEL RODS



No. 400



No. 401



No. 402



No. 406



No. 408

The Lietz Flexible Rods are 12 feet long and 3 inches wide.

Code Word

- No. 400.** Lietz Flexible Level Rod, diamond design, alternating, painted on especially prepared oil canvas. May be rolled up in a package 3 inches long and less than 1½ inches in diameter. Weight 3 ounces. Punched with eyelets for attachment to board..... **FLORIST**
- No. 401.** Lietz Flexible Level Rod, same as No. 400 but Philadelphia design..... **FLORY**
- No. 402.** Lietz Flexible Level Rod, same as No. 400 but in the metric system..... **FLOSH**
- No. 406.** Chicago Flexible Level Rod, 1½ inches wide, 12½ feet long, graduated to 100ths of feet..... **FLOUNDER**
- No. 406A.** Same as No. 406 but 16½ feet long..... **FLOURY**
- No. 406B.** Same as No. 406 but 20½ feet long..... **FLOWBIT**
- No. 408.** Chicago Flexible Level Rod, 1½ inches wide, 12½ feet long, graduated in feet, inches and eighths..... **FLOWERET**

SEE PRICE LIST IN BACK OF CATALOG

LIETZ LEVELING RODS

These leveling rods are of our own manufacture. They are accurate, durable and convenient to handle. Graduated to hundredths by uniform clean divisions, the black numerals corresponding to the tenths have an exact height of 0.06 foot and the red or foot numerals are 0.08 foot high. This affords a rod reading at distances where graduation lines disappear.

Wood—The rods are made of carefully selected, thoroughly seasoned, straight grained maple.

Graduations—The graduations are stamped in the wood from accurate machined steel dies on the Lietz precision linear press, a machine especially designed by us.

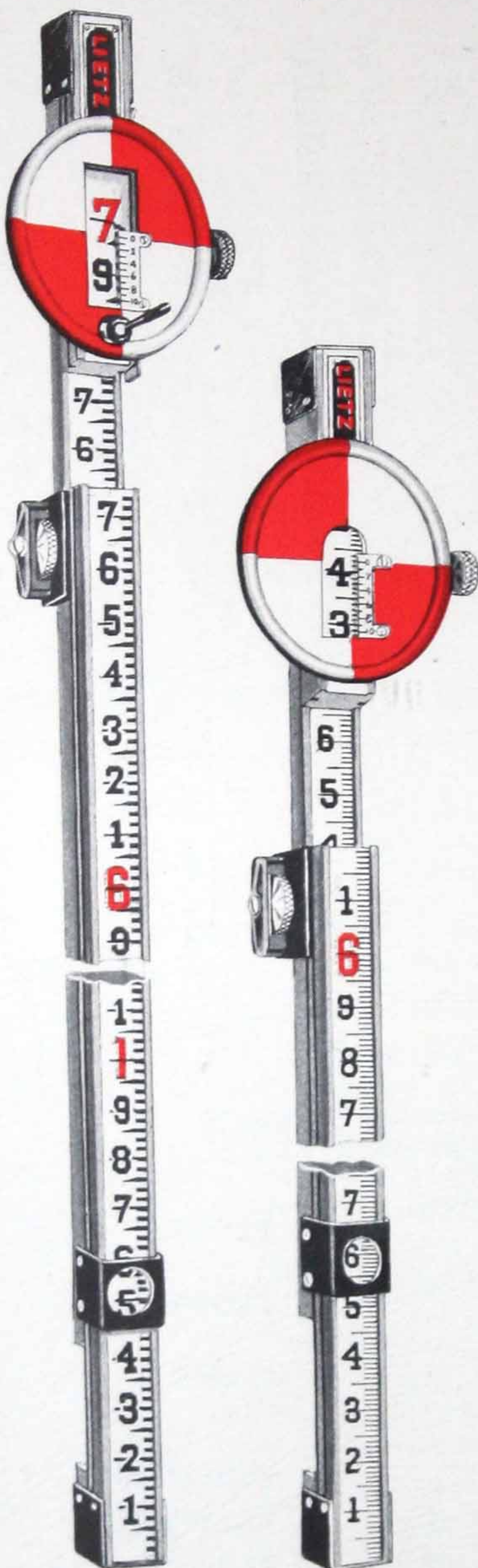
Finish—Machined and sanded to assure smoothness in operation, the surface is prepared with a special permanent white lacquer. The entire rod is covered with special weather resisting varnish, nicely rubbed.

Style of Graduation—Lietz rods are manufactured in two self-reading designs known as the block and line graduations.

Target—The target and all connecting parts are cast in one piece of our special hard metal alloy made from virgin metals only. Brass vernier set in flush with face.

Micrometer Target—This feature consists of an arrangement controlled by a small handle placed at the lower edge of the target and permits rapid and accurate setting. Can be operated only before the target is clamped and target cannot therefore be moved accidentally after it has been set with the clamp screw.

Clamping Screws—The clamping screws are so constructed that they cannot fall out and are designed to give efficient service under all conditions.



410-412
Block
Graduations
(with micrometer
target)

420-425
Line
Graduations
(with plain
target)

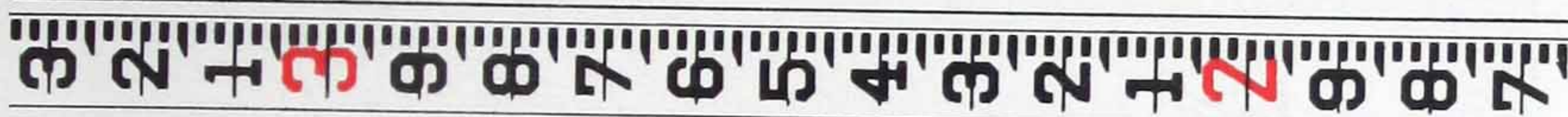
LIETZ LEVELING RODS WITH LINE GRADUATIONS



Divided to feet, tenths and hundredths, vernier reading to thousandths of a foot.

		Code Word
No. 410.	8' sliding to 15' with round target.....	FLUFF
No. 410M.	8' sliding to 15' with micrometer target.....	FLUFAD
No. 0410.	8' sliding to 15' without target.....	FLUFET
No. 411.	7' sliding to 13' with round target.....	FLUID
No. 411M.	7' sliding to 13' with micrometer target.....	FLUICK
No. 0411.	7' sliding to 13' without target.....	FLUITE
No. 412.	6½' sliding to 12' with round target.....	FLUKE
No. 412M.	6½' sliding to 12' with micrometer target.....	FLUKAD
No. 0412.	6½' sliding to 12' without target.....	FLUKOR

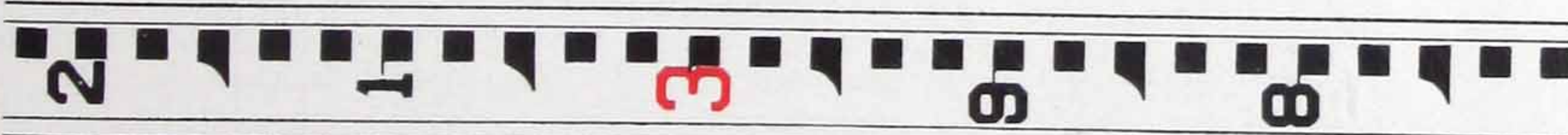
LIETZ LEVELING RODS WITH BLOCK GRADUATIONS



Divided to feet, tenths and hundredths, vernier reading to thousandths of a foot.

		Code Word
No. 420.	8' sliding to 15' with round target.....	FLUSTER
No. 420M.	8' sliding to 15' with micrometer target.....	FLUSTAX
No. 0420.	8' sliding to 15' without target.....	FLUSTOP
No. 421.	7' sliding to 13' with round target.....	FLUTIST
No. 421M.	7' sliding to 13' with micrometer target.....	FLUTIRE
No. 0421.	7' sliding to 13' without target.....	FLUTIZE
No. 422.	6½' sliding to 12' with round target.....	FLUWALL
No. 422M.	6½' sliding to 12' with micrometer target.....	FLUWIM
No. 0422.	6½' sliding to 12' without target.....	FLUWAX
No. 423.	5' sliding to 9' with round target.....	FLUX
No. 423M.	5' sliding to 9' with micrometer target.....	FLUXAD
No. 0423.	5' sliding to 9' without target.....	FLUXER
No. 425.	3' sliding to 5' with round target.....	FLUXION
No. 425M.	3' sliding to 5' with micrometer target.....	FLUXIRE
No. 0425.	3' sliding to 5' without target.....	FLUXOD

LIETZ LEVELING RODS WITH METRIC GRADUATIONS



Divided meters, decimeters and centimeters, vernier reading to millimeters.

		Code Word
No. 428.	2.2 m. sliding to 4 m. with round target.....	FLYBLOW
No. 428M.	2.2 m. sliding to 4 m. with micrometer target.....	FLYLEAF
No. 0428.	2.2 m. sliding to 4 m. without target.....	FLYTRAP

SEE PRICE LIST IN BACK OF CATALOG

ARCHITECTS' RODS

Our Architects' Rods are made of straight-grained thoroughly seasoned maple, machined and sanded to assure smoothness in operation, finished with weather-resisting varnish, nicely rubbed. They are lighter in weight and construction than the regular Philadelphia Leveling Rods, fitted with metal target with brass vernier and reinforced at each end with metal shoe.

Code Word



- No. 430.** Architects' Leveling Rod, 5½ to 10 feet, with clamp and target, divided in feet, inches and 8ths, vernier reading to 64ths of an inch. **FLYKITE**
- No. 431.** Same as No. 430, but divided in feet, 10ths and 100ths, vernier reading to 1000ths of foot. **FLYWHEEL**
- No. 432.** Wooden Leveling Rod and Target, made of seasoned stock in two 4-foot sections, total height 8 feet, divided in feet, inches and quarter-inches. The foot figures in red, the inches in black. **ECHABLE**

EXTRA TARGETS FOR LEVELING RODS

- No. 437.** Extra round target for Philadelphia Leveling Rod. **FOACK**
- No. 437M.** Extra micrometer target for Philadelphia Leveling Rod. **FOAD**
- No. 439.** Extra target for Architects' Rod. **FOADER**
- No. 440.** Extra clamping screws for targets. **FOAGOR**

CANVAS COVERS FOR LEVELING RODS

- No. 441A.** Sewed canvas bag for 5' leveling rods. . . . **FOALE**
- No. 441B.** Sewed canvas bag for 9' leveling rods. . . . **FOALIN**
- No. 441C.** Sewed canvas bag for 12' leveling rods. . . **FOAM**
- No. 442A.** Sewed canvas bag for 13' leveling rods. . . **FOCAL**
- No. 442B.** Sewed canvas bag for 15' leveling rods. . . **FOCARE**



ROD LEVEL

- No. 449.** Lietz Improved Rod Level.
. Code Word, **FOGBELL**

This Rod Level is an improved type, used to hold rod or pole of any shape perpendicular.

It can either be fastened to the rod by means of a flat-head screw, for which there is a key slot provided, or pressed against the rod or pole while holding. Indispensable for stadia work.

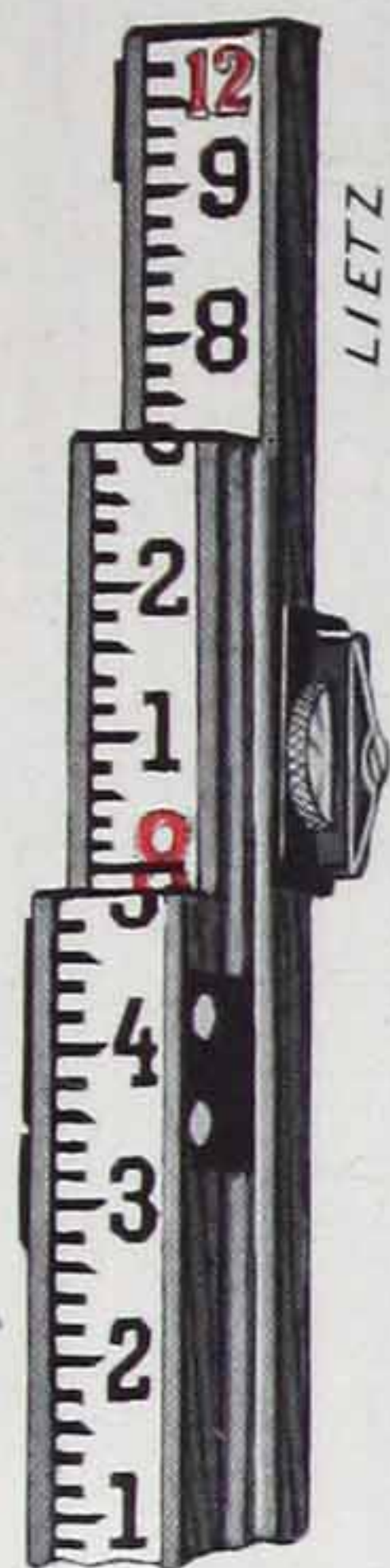


No. 449

SEE PRICE LIST IN BACK OF CATALOG

SAN FRANCISCO 3-PLY RODS

The ideal rod for carrying in an automobile. It is light, portable and convenient to handle. Made with the same care and precision as our Philadelphia type rods.



Wood—Carefully selected, thoroughly seasoned, straight-grained maple.

Graduations—Stamped in the wood from accurate machined steel dies.

Finish—Machined and sanded to assure smoothness in operation. Surface prepared with a special permanent white lacquer. Entire rod treated with weather-resisting finish, nicely rubbed.

Fittings—All hardware fittings are made of heavy drawn brass to withstand unusual wear. Clamping screws are designed to give efficient service under all conditions.

These rods are not furnished with a target.

No. 444A. San Francisco 3-Ply Rod $3\frac{1}{2}'$ extending to 9' divided feet, tenths and hundredths of a foot. **FOSTAX**

Code Word

No. 444B. San Francisco 3-Ply Rod $4\frac{1}{2}'$ extending to 12' divided feet, tenths and hundredths of a foot. **FOSTER**

No. 444C. San Francisco 3-Ply Rod $5\frac{1}{2}'$ extending to 15' divided feet, tenths and hundredths of a foot. **FOSTRUM**

Canvas Covers for San Francisco Rods

No. 445A. Sewed Canvas bag for 3 ply Rod No. 444A. **FOSWARE**

Code Word

No. 445B. Sewed Canvas bag for 3 ply Rod No. 444B. **FOSWAX**

No. 445C. Sewed Canvas bag for 3 ply Rod No. 444C. **FOSWELT**

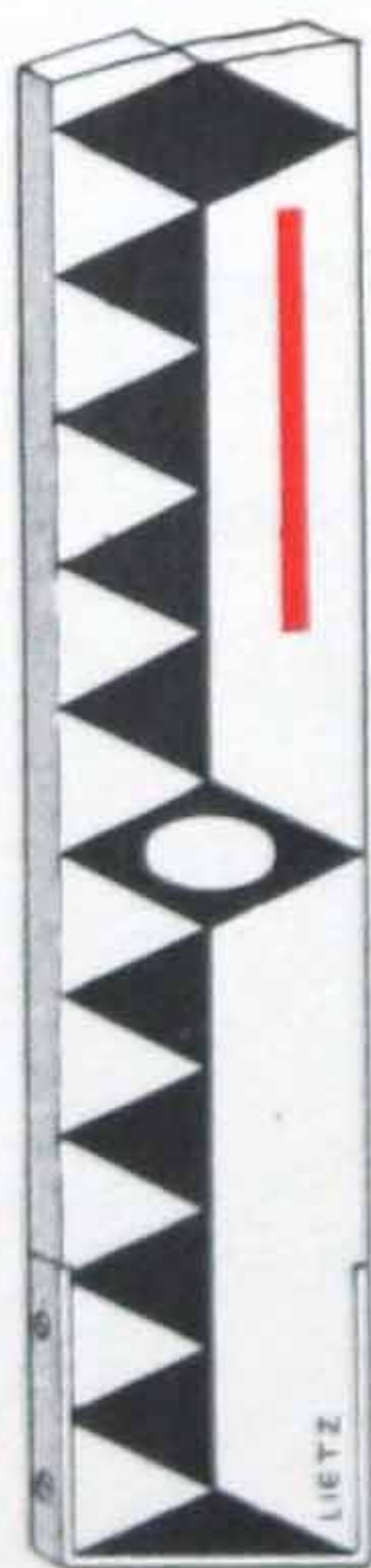
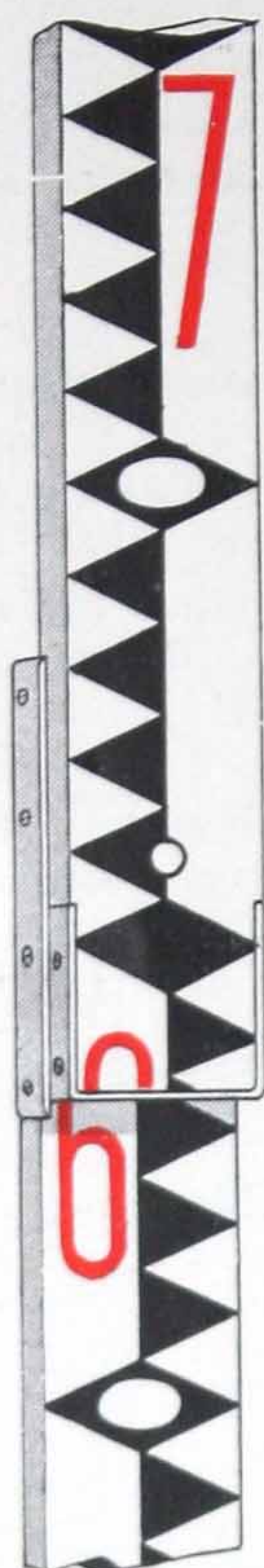
SEE PRICE LIST IN BACK OF CATALOG



THE A. LIETZ COMPANY

SAN FRANCISCO, U. S. A.

MODERN ENGINEERS' AND
SURVEYORS' INSTRUMENTS



450-455
DIAMOND DESIGN



450-455
FOLDED



460-462



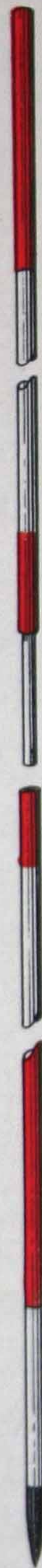
465



466



468



469

LIETZ STADIA RODS

For designs of Flexible Level Rods, see page 127.

	Code Word
No. 450. Lietz Stadia Rod, $2\frac{3}{4}$ in. wide, diamond design (alternating), 12 feet long, 2-fold. Same design as Flexible Rod No. 400.....	FOILER
No. 451. Lietz Stadia Rod, $2\frac{3}{4}$ in. wide, diamond design (alternating), 15 feet long, 3-fold. Same design as Flexible Rod No. 400.....	FOISTER
No. 454. Lietz Stadia Rod, $2\frac{3}{4}$ in. wide, graduated in the metric system, 3 meters long, 2-fold. Same design as Flexible Rod No. 402.....	FOLDEROL
No. 455. Lietz Stadia Rod, $2\frac{3}{4}$ in. wide, graduated in the metric system, $4\frac{1}{2}$ meters long, 3-fold. Same design as Flexible Rod No. 402.....	FOLIOLE
No. 460. Lietz Plain Stadia Rod, Philadelphia block design, in one piece with tapering rib, 10 feet long.....	FOLLICLE
No. 461. Same as No. 460, but 12 feet long.....	FOLLOWER
No. 462. Same as No. 460, but 14 feet long.....	FOLLY

RANGING POLES

Steel Ranging Poles, $\frac{1}{2}$ -inch in diameter, octagonal, solid with pointed end, divided in feet, alternately red and white.

	Code Word
No. 465A. 6 feet.....	FOMER
No. 465B. 8 feet.....	FONDU

Wooden Ranging Poles, $\frac{7}{8}$ to $1\frac{3}{8}$ inches in diameter, tapered, octagonal with steel-pointed shoe, divided in feet, alternately red and white.

	Code Word
No. 466A. 6 feet.....	FOOTBALL
No. 466B. 8 feet.....	FOOTMAN
No. 466C. 10 feet.....	FOOTPAD

Wooden Ranging Poles, like No. 466, but divided in meters.

	Code Word
No. 467A. 2 meters.....	FORAGE
No. 467B. $2\frac{1}{2}$ meters.....	FORAMEN
No. 467C. 3 meters.....	FORAY

No. 468. Sectional Ranging Poles, $1\frac{1}{16}$ -in. in diameter, round, steel. In two sections, each $4\frac{1}{2}$ feet long, jointed with metal telescope tubing, making an absolutely rigid pole $8\frac{1}{2}$ feet long with steel-pointed shoe. In two-pocket canvas bag.....	FOREBOW
No. 469. Sectional Mining Pole, as No. 468, but $\frac{5}{8}$ -in. in diameter and in three sections, each 33 in. long, lengthening out to $7\frac{1}{4}$ feet. In three-pocket canvas bag.....	FORECAST

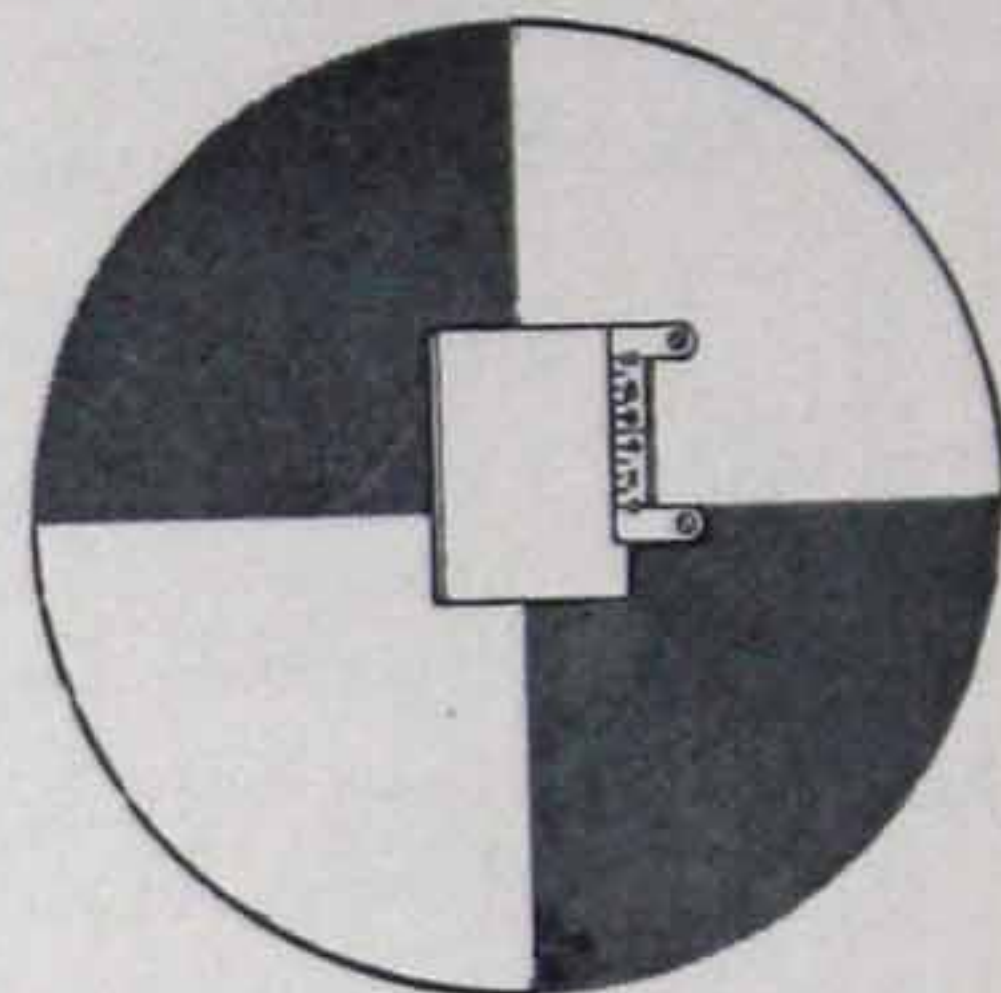
SEE PRICE LIST IN BACK OF CATALOG

CHICAGO JOINTED LEVELING AND STADIA RODS

CHICAGO JOINTED LEVELING RODS

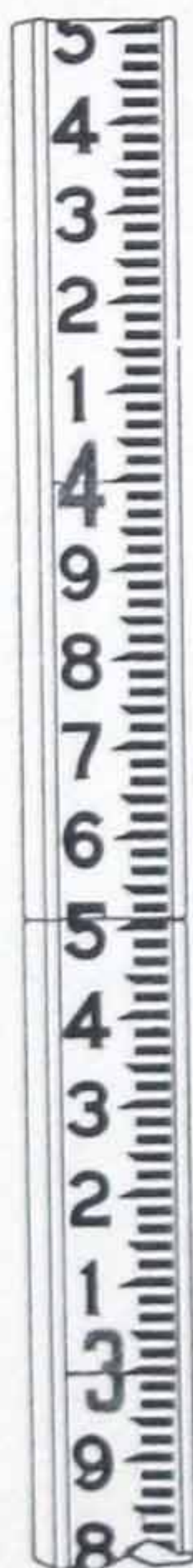


These Rods are made of 3 or 4 pieces of selected hardwood, 2 inches wide, 1 inch thick and $4\frac{1}{2}$ feet long. They are joined by telescope socket joints, making when put together a very rigid rod $12\frac{1}{2}$ or $16\frac{1}{2}$ feet long. The face is on one plane and the entire rod from top to bottom when extended is the same size, making it possible to use two targets for stadia work. The graduations are similar to our Philadelphia leveling rods Nos. 421-425 (BLOCK GRADUATION). The feet are marked in red figures and the 10ths in black figures. Each rod contained in a canvas carrying bag.



No. 472-2S

- No. 470A.** Chicago Jointed Leveling Rod, in 3 sections, each $4\frac{1}{2}$ feet long, making a rigid rod $12\frac{1}{2}$ feet long. Without target, in canvas carrying bag.....Code Word, **FORELAND**
- No. 470B.** Chicago Jointed Leveling Rod, in 4 sections, each $4\frac{1}{2}$ feet long, making a rigid rod $16\frac{1}{2}$ feet long. Without target, in canvas carrying bag.....Code Word, **FORELOCK**



CHICAGO JOINTED STADIA RODS

The Chicago Jointed Leveling Rod can be used for stadia work, but the Chicago Jointed Stadia Rod is designed for that purpose only. It is similar to the leveling rod, excepting that it is numbered from the top downward. By setting the upper stadia hair at "O," near the top of the rod, it saves calculation in estimating the distance. By the use of a pair of targets, readings to $1/1000$ of a foot can be made a half mile away. An equivalent to $1/10$ foot horizontally.

- No. 471A.** Chicago Jointed Stadia Rod, in 3 sections, each $4\frac{1}{2}$ feet long, making a rigid rod $12\frac{1}{2}$ feet long, without target, in canvas carrying bag.....Code Word, **FORERUN**
- No. 471B.** Chicago Jointed Stadia Rod, in 4 sections, each $4\frac{1}{2}$ feet long, making a rigid rod $16\frac{1}{2}$ feet long, without target, in canvas carrying bag.....Code Word, **FORESAIL**

TARGETS FOR CHICAGO JOINTED RODS

- No. 472A.** Fiber Target, round, with vernier for Chicago jointed leveling rods Nos. 470A and 470B, each.....Code Word, **FORESTAY**
- No. 472B.** Fiber Target, oval, constructed with open back so it may be slipped onto the rod at any point, with vernier for Chicago jointed leveling rods Nos. 470A and 470B, each.....Code Word, **FORETOP**
- No. 472-2S.** Fiber Targets, round, for Chicago jointed stadia rods Nos. 471A and 471B, furnished in pairs, one without vernier to clamp at top of rod and one with vernier. Per pair....Code Word, **FOREWIND**



470A-470B

SEE PRICE LIST IN BACK OF CATALOG

LIETZ PLUMB BOBS



Highest quality, made of brass, nicely finished, with screw caps and hardened steel points. THE CAPS AND POINTS ARE OF UNIFORM SIZE FOR ALL SIZES OF BOBS AND CAN READILY BE INTERCHANGED OR NEW ONES INSERTED.

Number.....	474	475	476	477	478
Weight.....	6-oz.	8-oz.	10-oz.	12-oz.	14-oz.
Code Word.....	FULLAN	FULLING	FULMER	FULORE	FULRAB
Number.....	479	480	481	482	
Weight.....	16-oz.	18-oz.	24-oz.	32-oz.	
Code Word.....	FULLET	FULMAX	FULMING	FULPICK	

Extras for Plumb Bobs

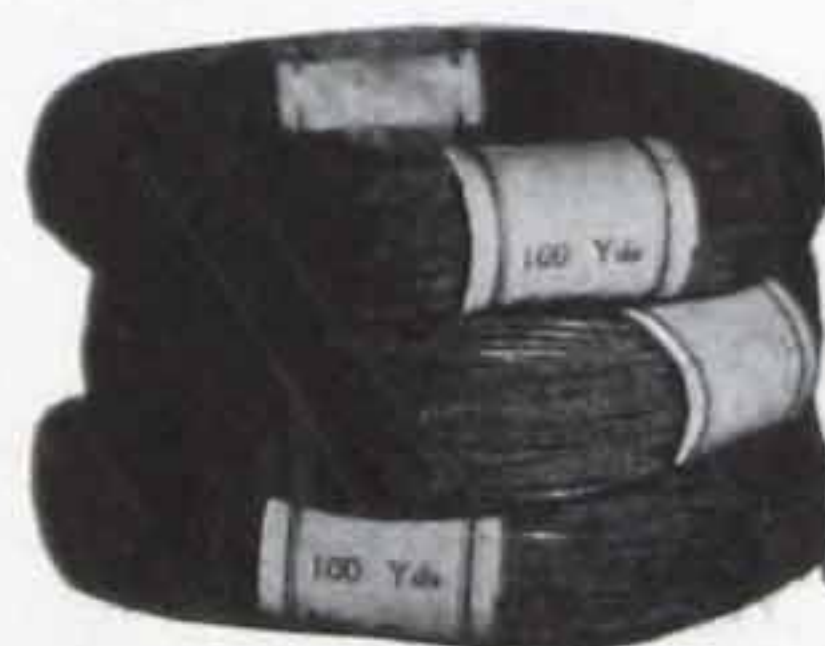
No. 484A.	Extra Points.....	Code Word FULSAR
No. 484C.	Extra Caps.....	FULSAGE

PLUMB-BOB CORD

- No. 485A. Best Braided Linen Cord, thick.....
No. 485B. Best Braided Linen Cord, medium.....
No. 485C. Best Braided Linen Cord, thin.....
No. 486. Best Braided Silk Cord, oiled, medium..

Plumb-bob Cord is put up in 25- and 100-yard hanks.

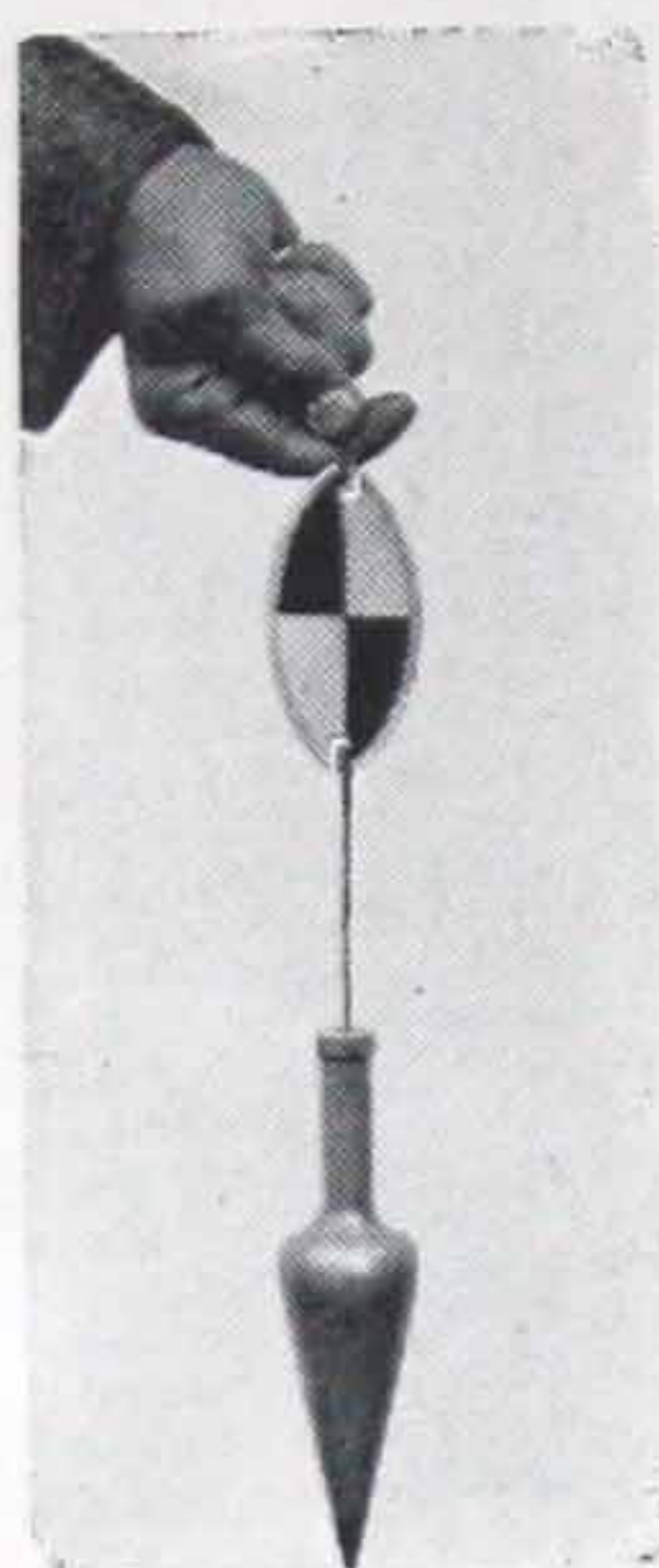
Per Yd.



No. 485B

SEE PRICE LIST IN BACK OF CATALOG

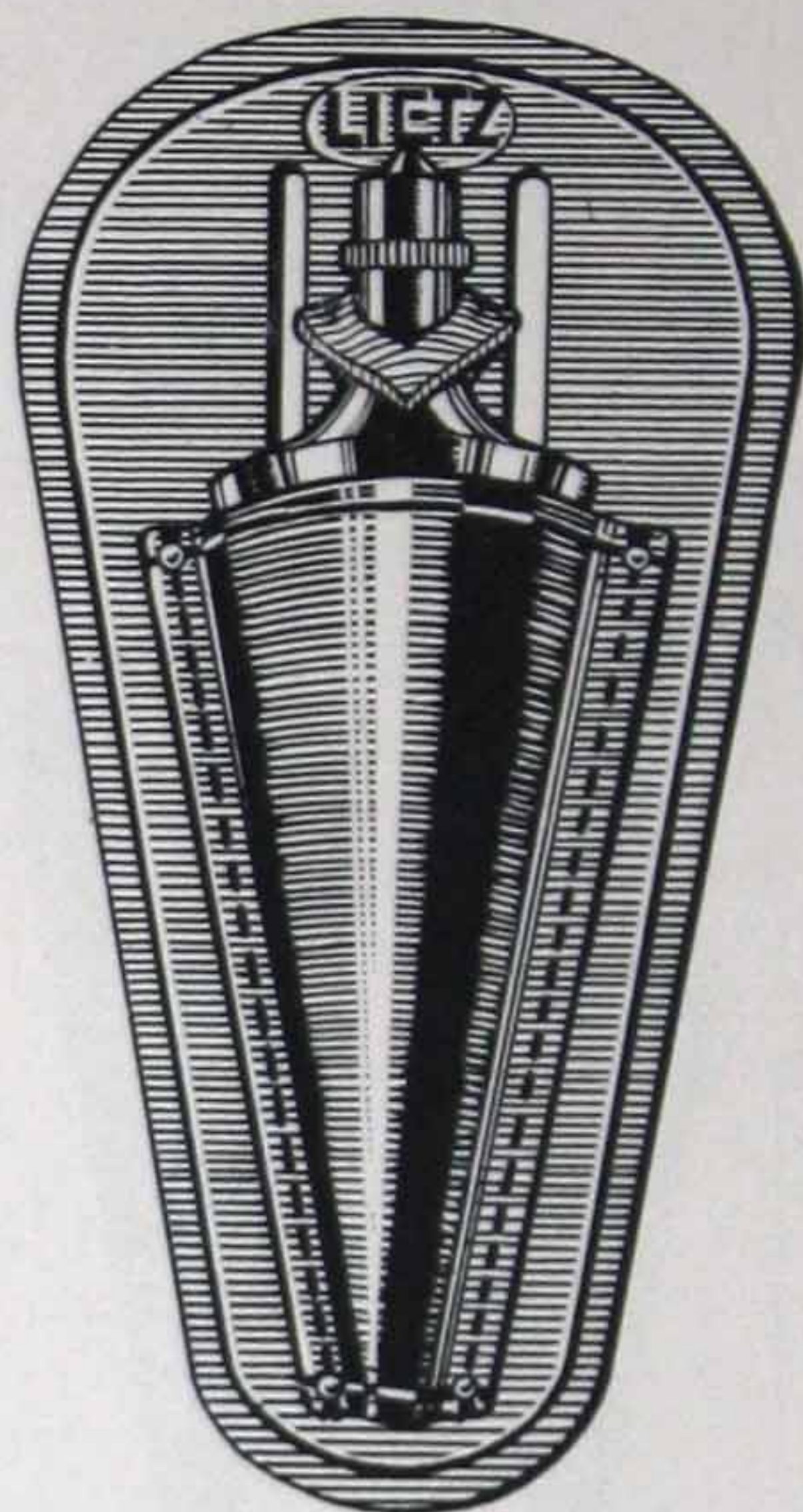
PLUMB BOBS AND ACCESSORIES



No. 490



No. 515



No. 516

BOB LINE TARGETS

No. 490. Wuth's Bob Line Target, made of pressed metal, for attaching to plumb-bob line. Painted red and white..... **FULTACK**

Code Word

IRON BOBS

No. 515. Iron Plumb Bob, 7-oz., black enameled finish..... **FULTARE**

LEATHER SCABBARDS FOR PLUMB BOBS

Our Scabbards are made with a leather strip which fits over the top of the bob, insuring it against loss. The back is a heavy piece of flat leather and the point of the bob cannot wear through and injure the user, with belt loop.

Number.....	516A	516B	516C	516D	516E
For Plumb bob.....	6 oz.	8 oz.	10 oz.	12 oz.	14 oz.
Code Word.....	FULTE	FULTED	FULTEG	FULTELA	FULTENT
Number.....	516F	516G	516H	516K	
For Plumb bob.....	16 oz.	18 oz.	24 oz.	32 oz.	
Code Word.....	FULTERO	FULTESS	FULTIC	FULTIF	



No. 520

PLUMMET ADJUSTER

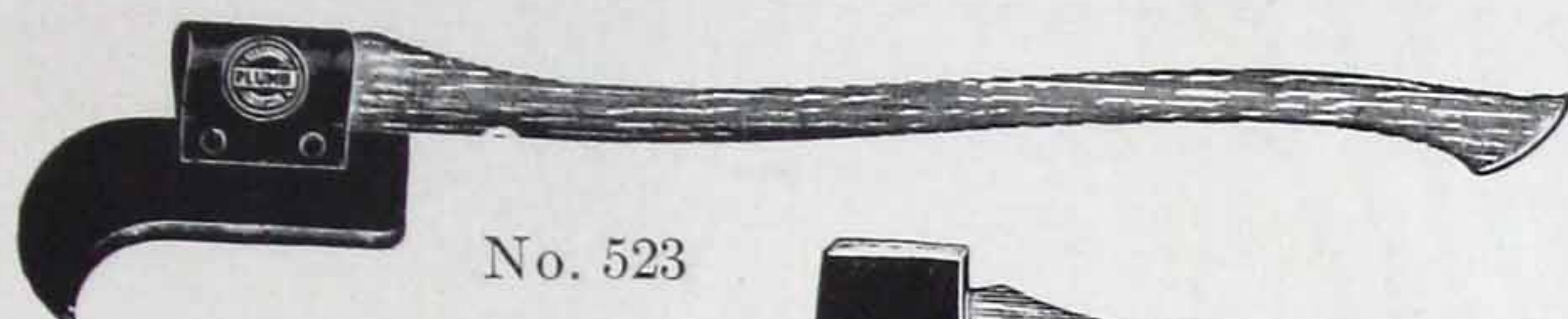
No. 520. Plummet Adjuster. By pressing sides of adjuster and moving it up or down the proper length of string the plummet height is quickly secured with one hand, leaving the other hand free to shift the transit head to position over tack or center. The adjuster grips instantly on releasing pressure. No tying or untying of knotted strings. Saves time, trouble and tire-some stooping.....Code Word, **FULTIRE**

SEE PRICE LIST IN BACK OF CATALOG

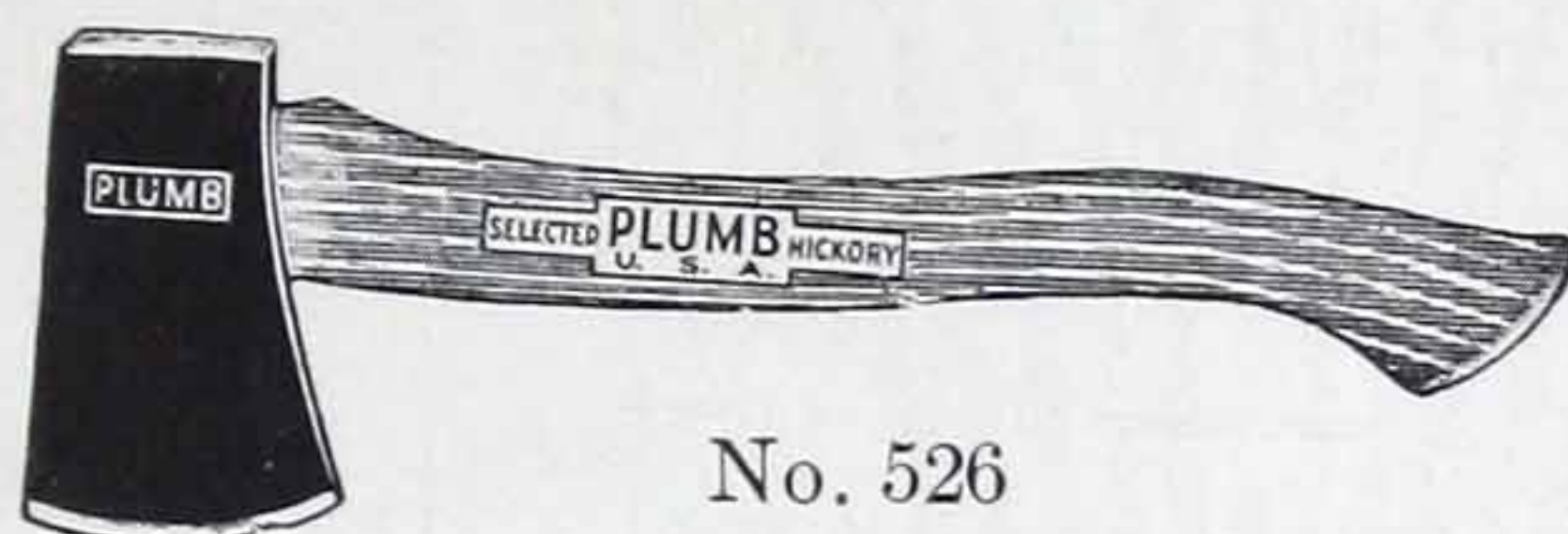
BUSH KNIVES, AXES AND GEOLOGISTS' PICKS



No. 521



No. 523



No. 526



No. 526A

Code Word

- No. 521.** Engineers' Bush Knives for cutting shrubs, brush, and for sharpening stakes. 22-inch blade..... **FURAD**
No. 521A. Same as No. 521, in fancy leather sheath..... **FURAGE**
No. 523. Engineers' Bush Hooks, fitted with long ax handle; weight 3 lbs..... **FURALET**
No. 526. Select Quality Hand Ax. Weight 1½ pounds..... **FURALON**
No. 526A. Select Quality Hand Ax, in leather sheath..... **FURATOR**



No. 527



No. 528



No. 531



No. 532

- No. 527.** Geologists' Prospecting Pick, square corners, sharp edges and point. Weight 1 pound..... **FURAZE**

STAKE TACKS AND SURVEYING SPADS

- No. 528B.** Stake Tacks, galvanized, box of 100 **FYBELL**
No. 528C. Stake Tacks, galvanized, in one-pound packages.... **FYBIN**

Above Tacks have an indentation in the surface of the head, to guide plumb bob point.

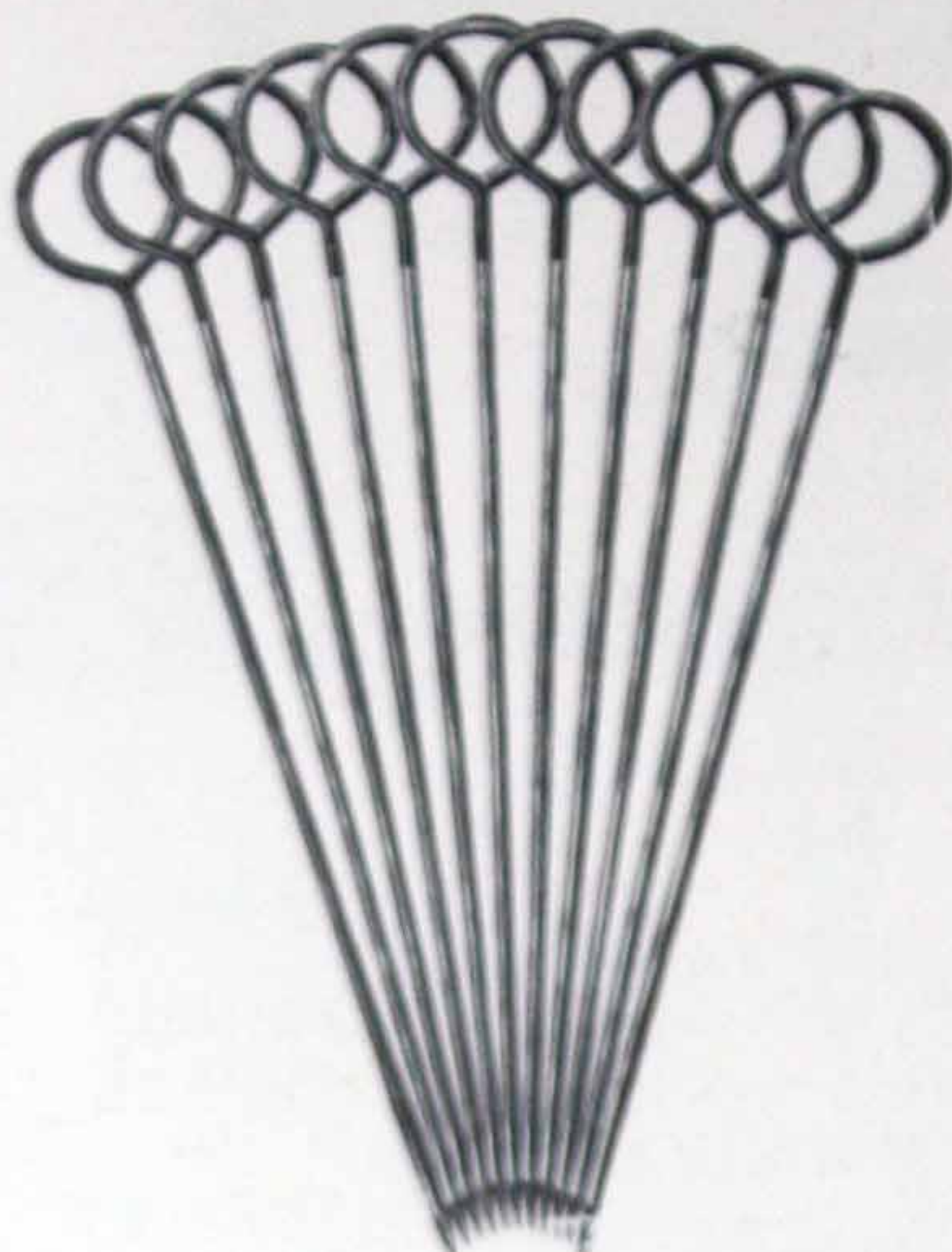
Surveying Spads, non-corrosive steel, 1¾ inches long, for suspending plumb bob from timbers in mines:

- No. 531A.** Box of 50..... **FYLORE**
No. 531B. In bulk, per 1000..... **FYMAN**
 Surveying Spads, hook-shape, steel, 2 inches long:
No. 532A. Box of 50..... **FYNOR**
No. 532B. In bulk, per 1000..... **FYRLING**

SEE PRICE LIST IN BACK OF CATLOG

SURVEYORS' ARROWS

The rings are enameled in bright vermillion.



Nos. 534-537



No. 549

	Code Word
No. 534. Steel Arrows, extra heavy, nickel plated, 10 inches long. Per set of 11.....	GABEL
No. 535. Steel Arrows, extra heavy, nickel plated, 14 inches long. Per set of 11.....	GABING
No. 536. Steel Arrows, not nickel plated, 10 inches long. Per set of 11.....	GABLOR
No. 537. Steel Arrows, not nickel plated, 14 inches long. Per set of 11.....	GABMORE
No. 538. Steel Arrows, painted red and white alternately every inch, 14 inches long. Per set of 11.....	GABOLT
No. 539. Steel Arrows, painted red and white alternately every inch, 6 inches long. Per set of 11.....	GABRIN

CARRYING RINGS AND SCABBARDS FOR ARROWS

No. 545. Steel Carrying Ring for arrows.....	GADON
No. 548. Leather Scabbard with carrying strap.....	GADROVE
No. 549. Leather Scabbard with belt strap.....	GADSTILE

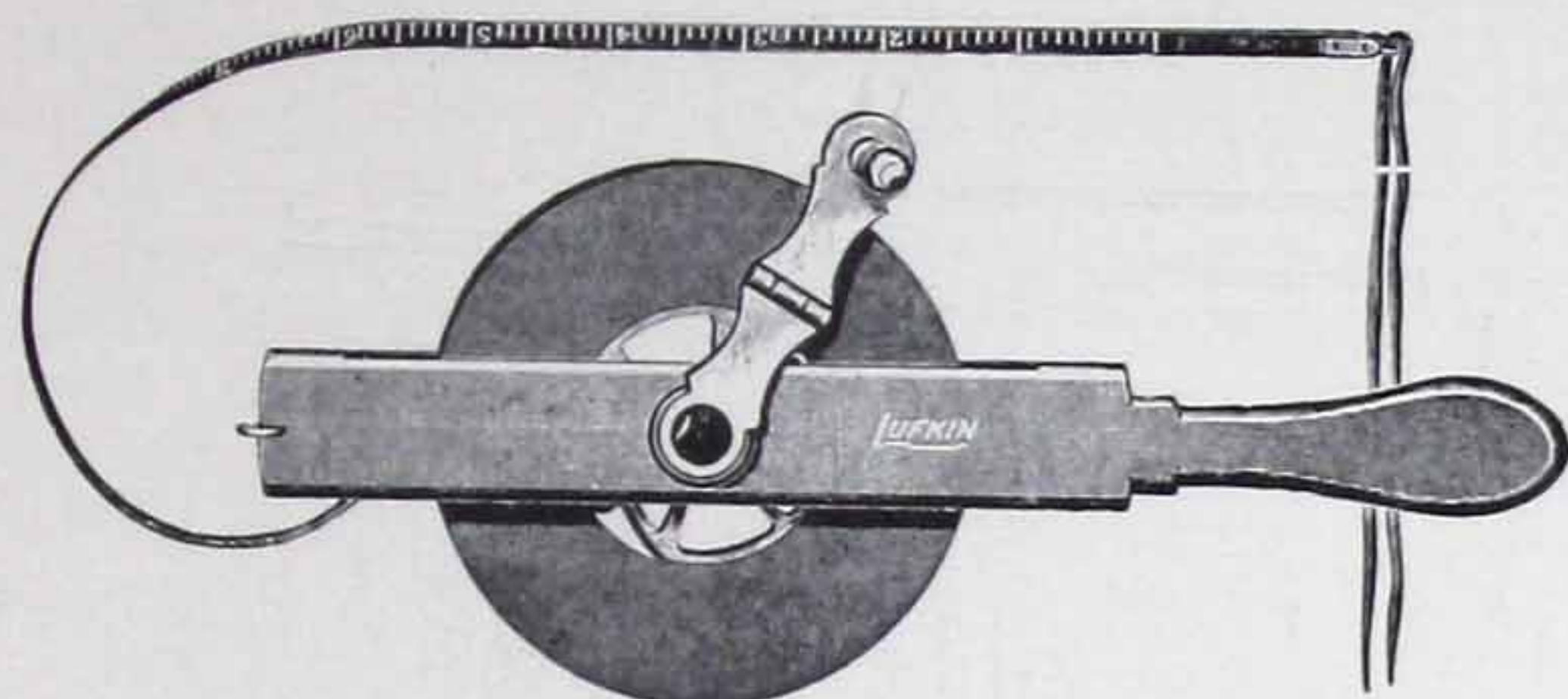
CLOTH FOR SURVEYORS' FLAGS

No. 550. Red Cloth. Per yard.....	
No. 551. White Cloth. Per yard.....	

SEE PRICE LIST IN BACK OF CATALOG

"PIONEER" CHAIN TAPES

Width: $\frac{1}{4}$ inch. Approximate Thickness: .020 inch. Etched Markings.



For Heavy Survey Work,
Yet Afford Closest Degree of Accuracy

Extra heavy **one-quarter** inch LINE, with markings etched into raised bright portions, therefore most legible and permanent. Guaranteed accurate. Leather thongs furnished with each tape. Hardwood REEL has folding winding handle and large drum. Line detachable from reel and has blank space each end.

With Heavy One-Quarter Inch
Steel Tapes

Graduated Every Foot, With End Feet in 100ths.

Tapes Complete, with Reel

		Wt. Each	Code Word
No. 5100.	100 ft.	2 $\frac{1}{2}$ lbs.	GAFF
No. 5200.	200 ft.	4 $\frac{1}{2}$ lbs.	GAFIN
No. 5300.	300 ft.	5 $\frac{1}{2}$ lbs.	GAFKE

Tapes Only, with Thongs

		Wt. Each	Code Word
No. 05100.	100 ft.	2 $\frac{1}{4}$ lbs.	GAGART
No. 05200.	200 ft.	3 $\frac{3}{4}$ lbs.	GAGBIN
No. 05300.	300 ft.	5 lbs.	GAGBOX
Thongs only.....per pair			GAGEYE

Reels Only

For 50 and 100-ft., 100-link, 25 and 30-meter Tapes.....	GAGIRE
For 150 and 200-ft., 200-link, and 50-meter Tapes.....	GAGIFF
For 300-ft., and 500-link Tapes.....	GAGOR

Geological Survey Reel No. 81



A sturdy 6-arm Reel of rust-proof metal with sides perforated. Has long, folding winding handle, large drum and polished hardwood "D" carrying handle.

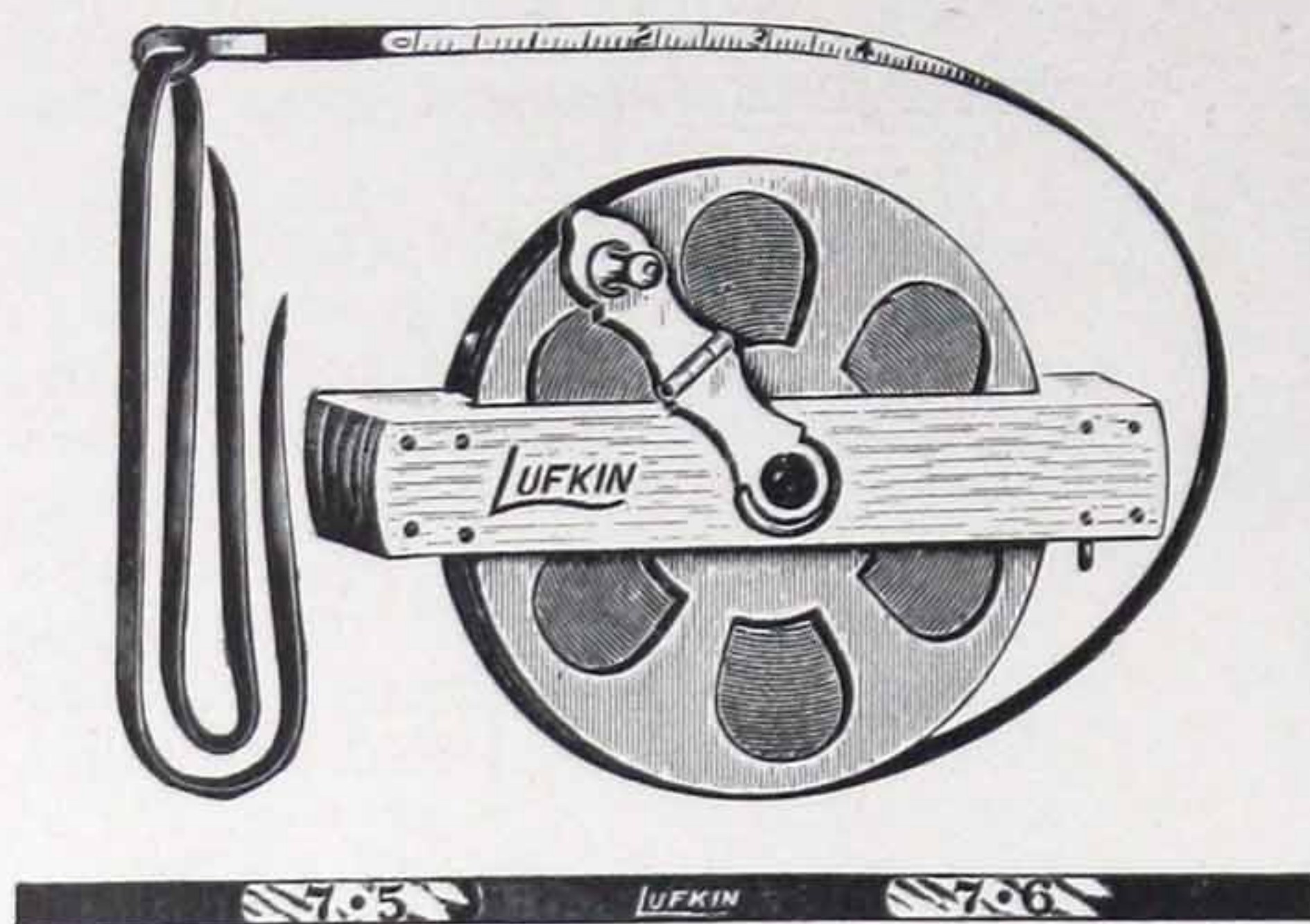
Made in one size only, 11 $\frac{1}{4}$ inch diameter. Will accommodate $\frac{1}{4}$ and $\frac{5}{16}$ inch Etched Chain Tapes 300 feet long, and $\frac{5}{16}$ inch Babbitt Tapes 200 feet long, i. e., lines such as Nos. 09300, 05300 and 03200 shown pages 139, 142 and 143.

No. 81. Reel.....Code Word, **GAGUN**

SEE PRICE LIST IN BACK OF CATALOG

"CANYON" CHAIN TAPES

Width $\frac{1}{8}$ Inch. Approximate Thickness: .025 Inch. Etched Markings.



**Reduce Wind Resistance
Handle Well on Rough Ground**

The LINE is **one-eighth** inch wide and extra heavy with markings etched into raised bright portions, legible and durable. Guaranteed accurate. Leather thongs furnished with each tape. The durable disk REEL is of sheet steel in dull nickel plated finish, mounted in hardwood frame, with strap handle. Line detachable from reel and has blank space each end.

**With Heavy One-Eighth Inch
Steel Tapes**

Graduated Every Foot, With End Feet in 100ths.

Tapes Complete, with Reel

No.	Length	Wt. Each	Code Word
No. 4100.	100 ft.	3 $\frac{1}{4}$ lbs.	GAIL
No. 4200.	200 ft.	4 $\frac{1}{4}$ lbs.	GAINAT
No. 4300.	300 ft.	5 $\frac{1}{2}$ lbs.	GAINER
No. 4500.	500 ft.	7 lbs.	GAINIX

Tapes Only, with Thongs

No.	Length	Wt. Each	Code Word
No. 04100.	100 ft.	1 $\frac{3}{4}$ lbs.	GALA
No. 04200.	200 ft.	2 $\frac{1}{4}$ lbs.	GALANGA
No. 04300.	300 ft.	3 $\frac{1}{4}$ lbs.	GALATINE
No. 04500.	500 ft.	5 lbs.	GALATEA
Thongs only.....per pair			GAGEYE

The above Tapes can be furnished graduated in the metric system on special order.

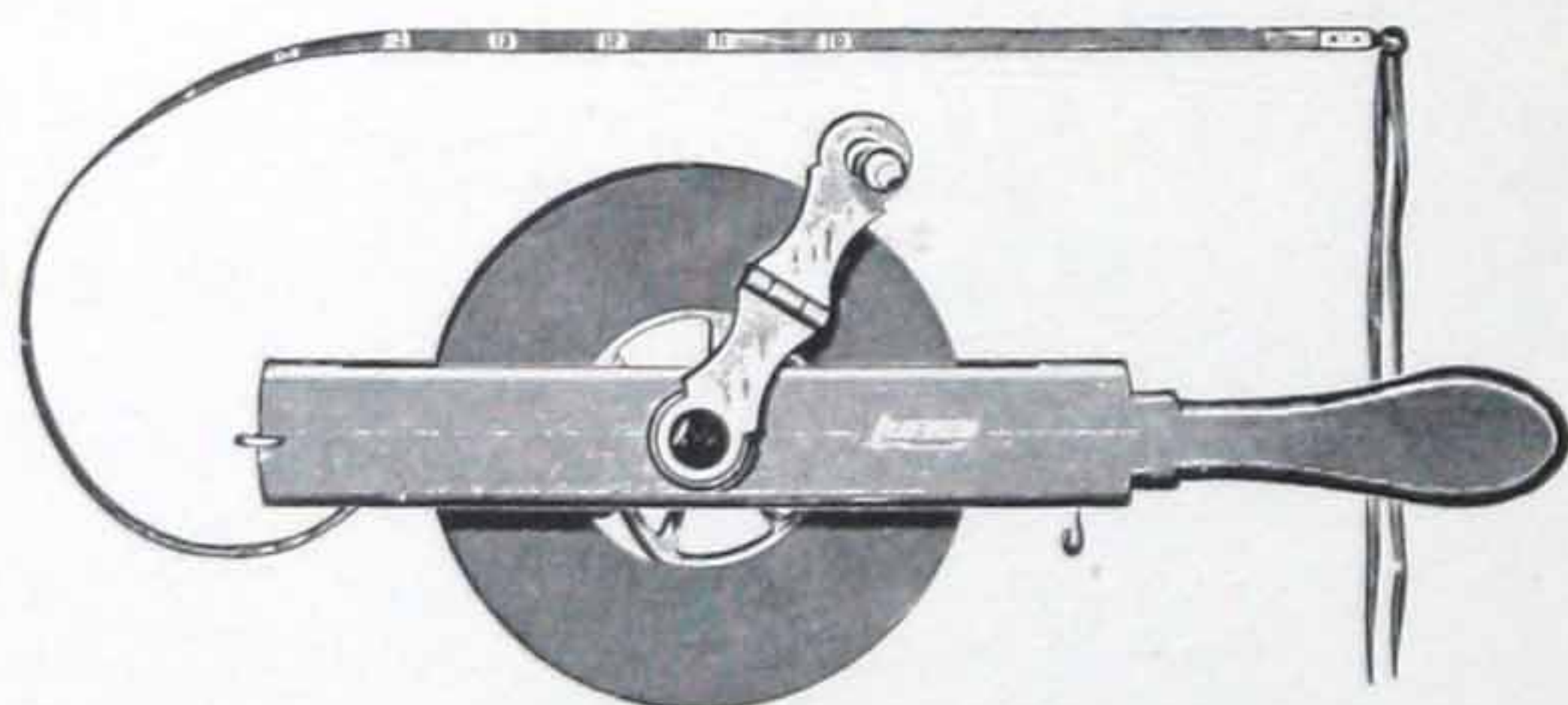
Reels Only

For 100, 150 and 200-ft., 100 and 200-link, and 25, 30 and 50-meter

Tapes.....**GALART**
For 300 and 500-ft., and 100-meter Tapes.....**GALASH**

Topographic Trailer Tape

(Slope Correction Tape)



Determine slope by using a topographic level. Reading the slope on the arc, measure two chains on the slope and as many graduations on the trailer as the arc reading shows. This distance measured on the slope represents a horizontal distance of two chains. In similar manner, one chain horizontal distance is determined by using the trailer graduations which appear on back of tape commencing opposite the 1-chain mark.

Used by the United States Forest Service, the Indian Service, etc. A sturdy steel tape and reel. Line $\frac{1}{4}$ inch wide, approximately .020 inch thick. All graduations etched into raised bright portions, except zero, one and two chain points, which are on brass sleeves securely fastened to tape.

Tape 2 $\frac{1}{2}$ -chains (165 feet) long. Graduated first two chains (200 links) to links; remaining half chain carries slope graduations numbered 5 to 50. Similar graduations, numbered 6 to 80 and used for very steep slopes, appear on back of the tape starting opposite the 1-chain point.

Heavy brass end clips, and each tape supplied with a pair of leather thongs. Furnished with or without reel. Line is readily detached from reel. Reel of polished hardwood with folding winding handle and nickel plated mountings.

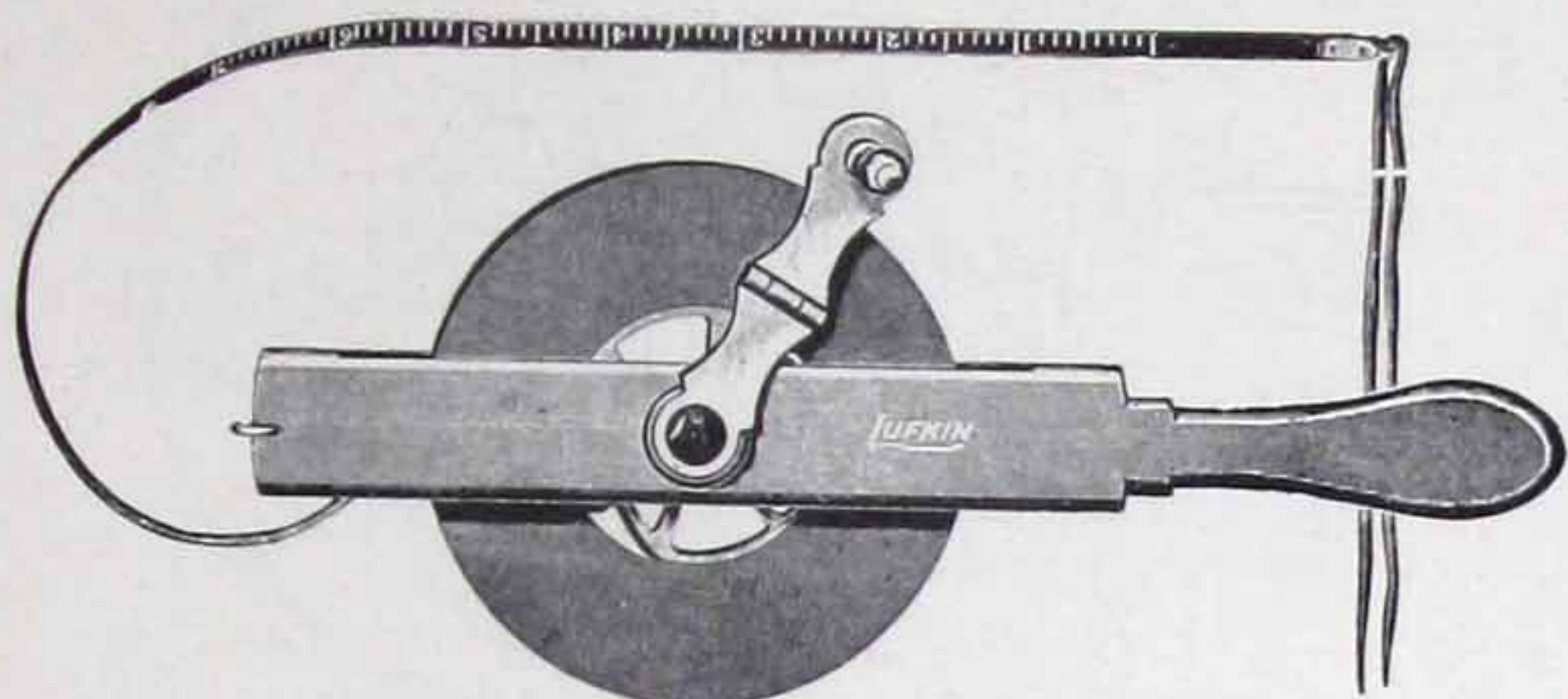
No.	Length	Code Word
5165T Topographic Trailer Tape with Reel and Thongs	2 $\frac{1}{2}$ chains	GALATA
05165T Topographic Trailer Tape without Reel, with Thongs	2 $\frac{1}{2}$ chains	GALATIP

(Length of above tapes is 2 chains plus trailer)

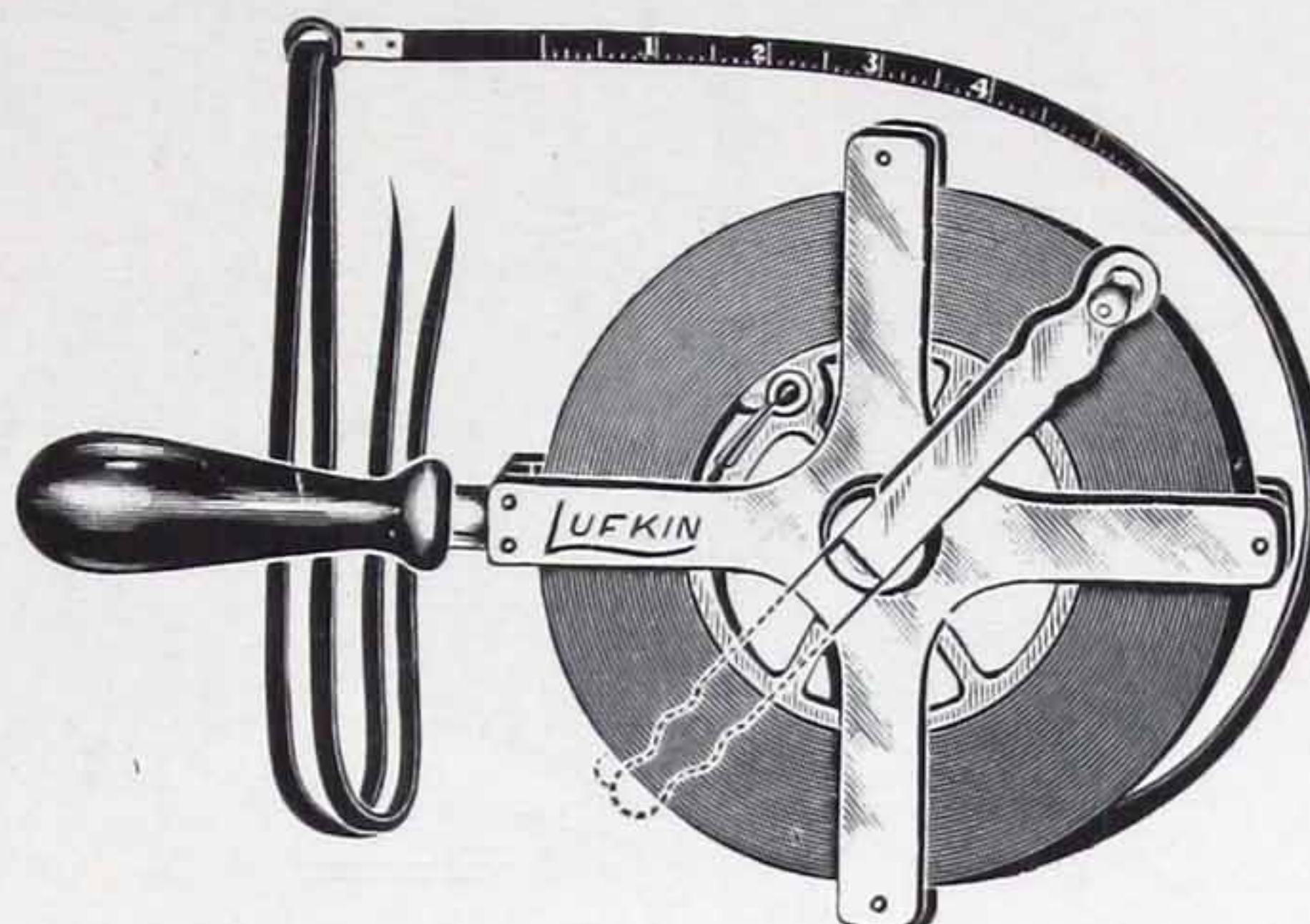
"WESTERN" ENGINEERS HEAVY STEEL TAPES

Thickness—Approximately .020 Inch, Graduated Entire Length to 10ths and 100ths of feet.

$\frac{1}{4}$ inch Wide



No. 1576D-XX on Hardwood Reel



No. 1276D-XX on Lock Handle Frame.



No. 1376D-XX
on "Wolverine" Reel

This is a heavy duty tape for engineering and construction work where extra durability and accuracy are desired. **The LINE is over 50% heavier than standard weight engineers' tapes** and is graduated the entire length to feet, 10ths and 100ths. Can be furnished on three styles of Reels illustrated above. Lines are detachable from reel and have blank space each end.

ON WOODEN REEL

Tapes Complete with Reel Code Word
No. 1576D-XX, 100 feet. **GAFLO**

Tapes only with thongs Code Word
No. 01276D-XX, 100 ft. **GAFMAN**

ON METAL REEL WITH LOCK HANDLE

Tapes Complete with Reel Code Word
No. 1276D-XX, 100 ft. **GAFNY**

Tapes only with thongs Code Word
No. 01276D-XX, 100 ft. **GAFMAN**

ON WOLVERINE REEL

Tapes Complete with Reel Code Word
No. 1376D-XX, 100 ft. **GAGDEL**

Tape only, with thongs Code Word
No. 01276D-XX, 100 ft. **GAFMAN**

All above Tapes can be marked Feet, Inches and 8ths at same prices.

U. S. Bureau of Standards Certificate with above Tape: Additional.

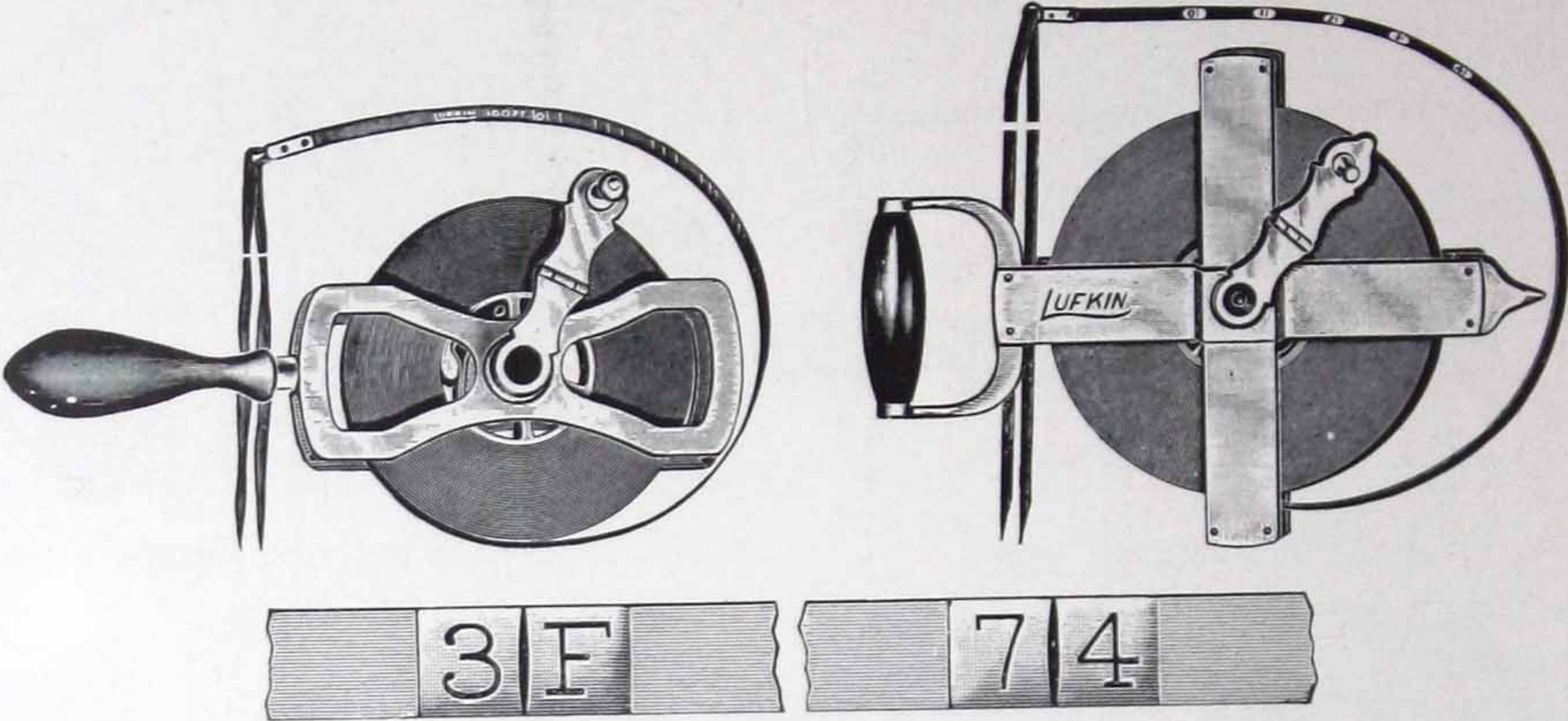
REELS ONLY

Reel only for No. 1576D-XX.	Code Word	GAGIRE
Reel only for No. 1276D-XX.		GAFNOG
Reel only for No. 1376D-XX.		GAFDOT

SEE PRICE LIST IN BACK OF CATALOG

"MICHIGAN" CHAIN TAPES

Width: $\frac{5}{16}$ Inch. Approx. Thickness: .015 Inch. Markings on Babbitt Metal,
Graduated on Babbitt Metal



The "Michigan" is especially popular in railroad and highway work. Line and reel stand up well in hard service. Line is of extra tough steel, white metal coated. Graduations and figures are deeply stamped into babbitt metal. Line is detachable from reel, has heavy brass end clips, and is furnished with a pair of leather thongs. Sturdy metal reel, in dull nickel plated finish, with polished hardwood handle and long, folding winding handle. Tapes over 100 feet long have 4-arm reel with "D" handle and spike end. Spike aids in holding reel when line is being withdrawn or rewound.

Tapes, Complete with Reel
5/16 inch wide.

		Code Word
No. 3050.	50 feet.....	GALESHA
No. 3100.	100 feet.....	GALLEY
No. 3066.	100 links.....	GALLEYMAN
No. 3200.	200 feet.....	GALEAN
No. 3300.	300 feet.....	GALEIC

Tapes Only, with Thongs
5/16 inch wide.

		Code Word
No. 03050.	50 feet.....	GALSER
No. 03100.	100 feet.....	GALLIR
No. 03066.	100 links.....	GALLISH
No. 03200.	200 feet.....	GALETORE
No. 03300.	300 feet.....	GALEUR

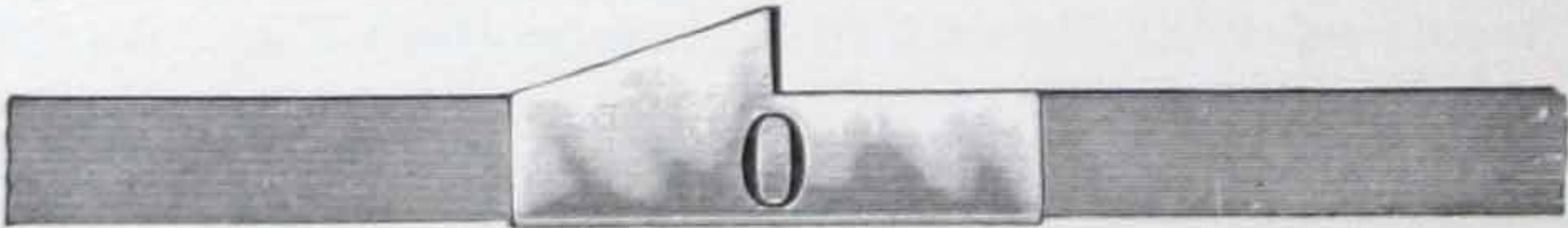
Reels Only

	Code Word
For 50 and 100 ft., 100-link, 25 and 30-meter Tapes.....	GALLID
For 200-ft., Tape.....	GALLIFT
For 300-ft., and 100-meter Tapes.....	GALLIGO
For 500-ft., Tape.....	GALLIME

Shipping Weight: Average, for above tapes without reel, 2 lbs. per 100 feet.

Half Railroad Gage Mark—This mark, 2' 4 $\frac{1}{4}$ " from zero, put on any above tapes, when specified, at no extra charge.

SHOULDERS FOR CHAIN TAPES



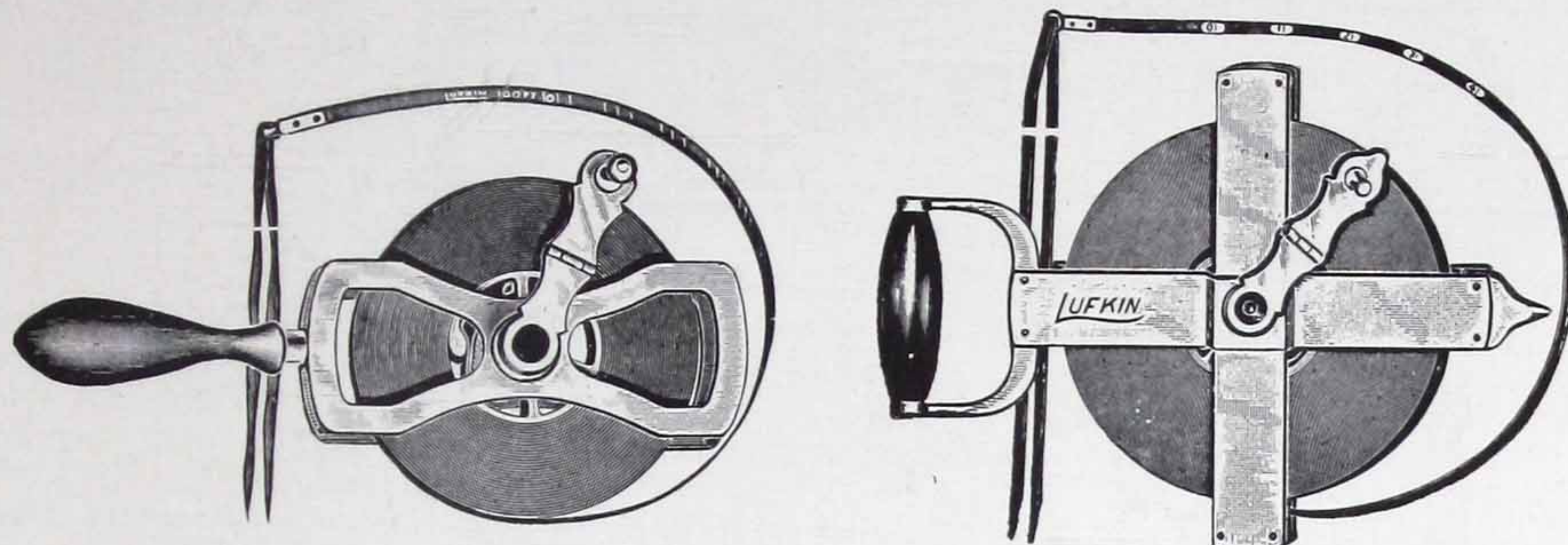
Some surveyors use in chaining a tape equipped with shoulders. These shoulders assist in locating the zero and the last graduation. They are carefully soldered to the tape and when so ordered will be supplied on any of our chain tapes.

Order by "W. S." Extra, per pair.....Code Word, GALLITHY

SEE PRICE LIST IN BACK OF CATALOG

HI-WAY DRAG TAPES

Width: $\frac{5}{16}$ Inch. Approximate Thickness .025 Inch. Etched Markings.



Extra Sturdy and Designed Especially for Highway, Railroad and Similar Work.

A heavy Chain Tape of **special tough steel** and with **extraordinary resistance to wear and tear**. Has "Nubian" Finish. Prominent black lines and figures deeply cut into bright portions of the line which are in high relief, therefore markings most permanent, easy to read and to locate even by touch. Outwears all other Chain Tapes, and markings remain clear even after much dragging of the tape.

"Hi-Way" Tapes have $\frac{1}{2}$ railroad gage mark at $2' 4\frac{1}{4}"$ from zero. Heavy brass end clips. Pair of leather thongs with each tape. Line detachable from reel. Sturdy metal reel in dull nickel plated finish, with polished hardwood handle, large drum, and long, folding winding handle. Tapes over 100 feet long have 4-arm reel with "D" handle and spike end.

Regular Markings One Side Only—Feet only every foot, with end feet in 100ths.

5/16 inch wide.

Code Word

No. 9050. 50 feet.....**GALOSH**
No. 9100. 100 feet.....**GALOSTER**
No. 9200. 200 feet.....**GALPAN**
No. 9300. 300 feet.....**GALPICK**

5/16 inch wide.

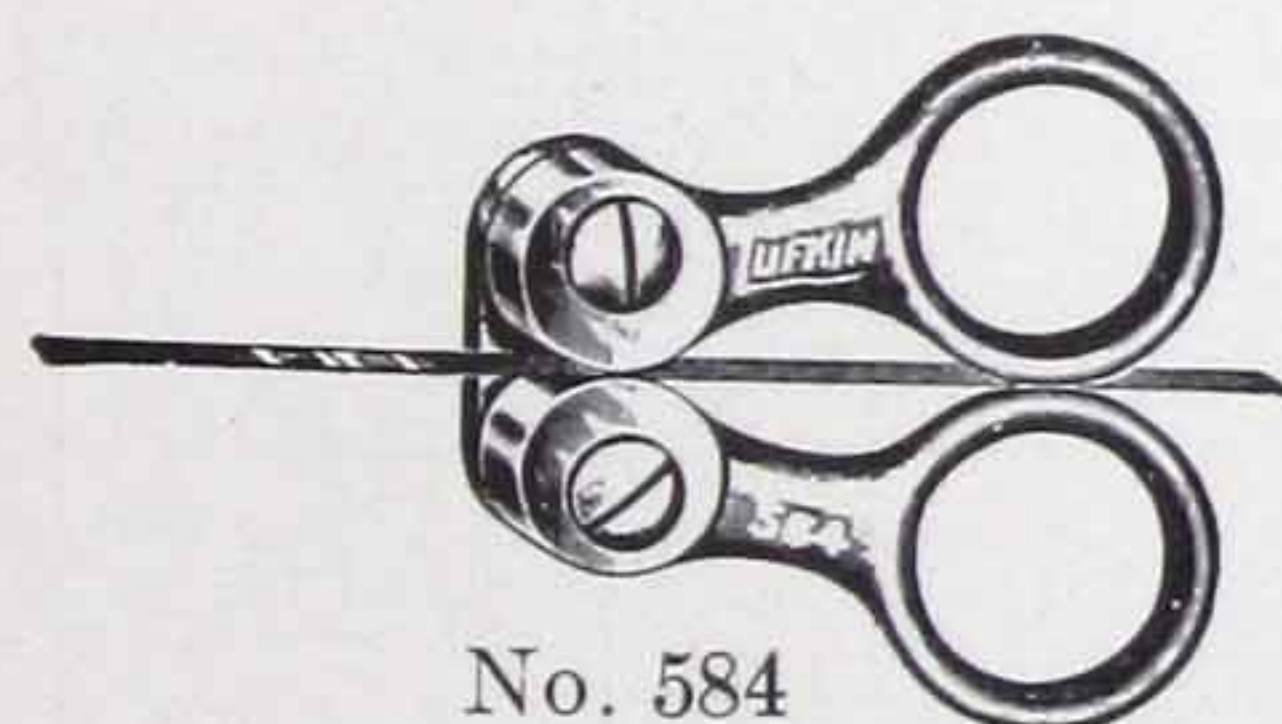
Code Word

No. 09050. 50 feet.....**GALSPRY**
No. 09100. 100 feet.....**GALSTERO**
No. 09200. 200 feet.....**GALSTOR**
No. 09300. 300 feet.....**GALSURF**

Reels Only

For 50 and 100-ft. Tapes.....**GALSAC**
For 200-ft. Tape.....**GALSED**
For 300-ft. Tape.....**GALSIT**

CLAMP HANDLES



No. 584

For positive and quick grip of a steel tape at any point. Sturdy, made of brass, nickel plated. Applied and removed by simply operating the handle. Will not damage a tape in any way.

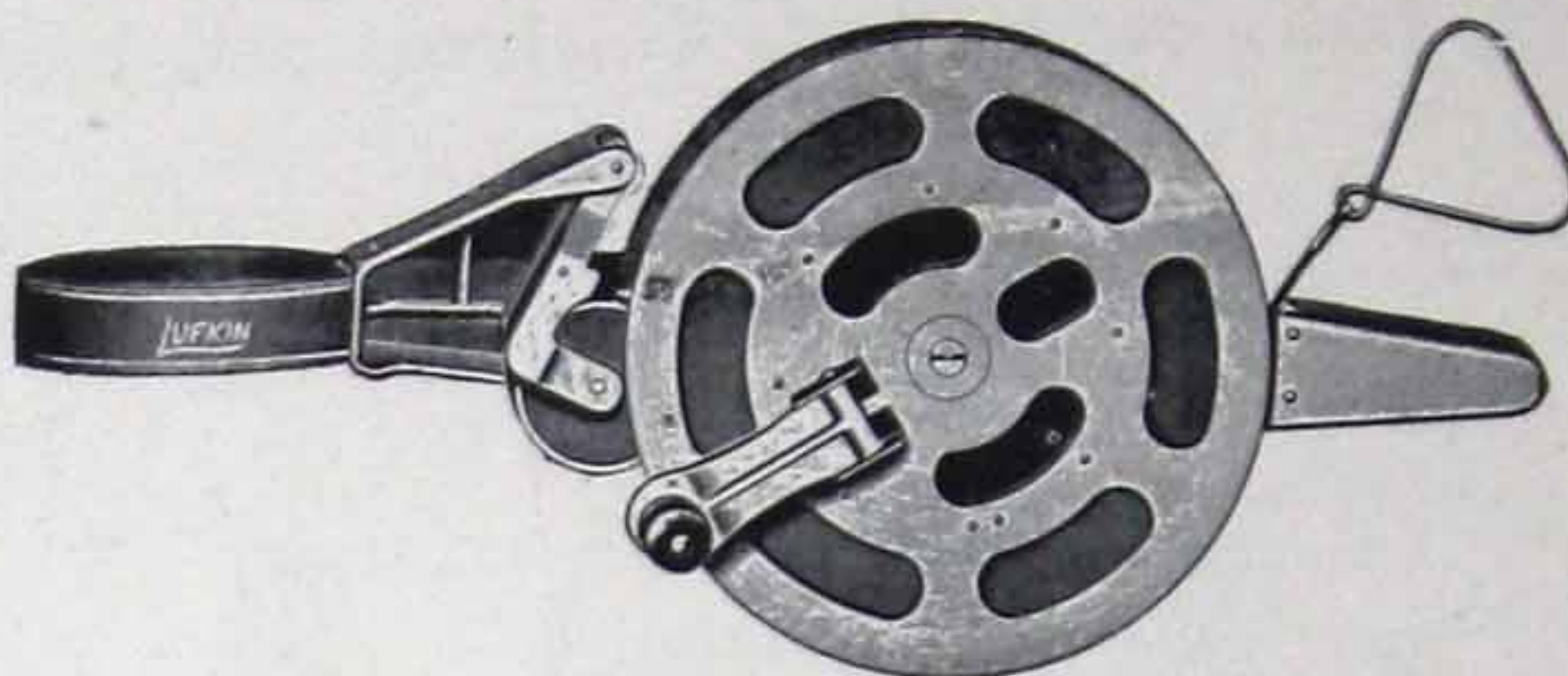
No. 584. Weight 4 oz.....Code Word, **GAMMON**

EXTRA SWIVEL HOOKS AND LEATHER THONGS

No. 585. Extra Swivel Hooks for chain tapes.....Each, **GAMUT**
No. 586. Extra Rawhide Thongs for chain tapes.....Pair, **GAGEYE**

SEE PRICE LIST IN BACK OF CATALOG

THE "CRIPPLE CREEK" REEL



Aluminum frame 14 inches long; nickel-plated steel reel 8 inches in diameter. A hardwood roller or spool is fitted between the sides or discs of reel which by means of a spring presses toward the axis of reel, causing the tape to wind up evenly and tightly and keeping it in place. Long, neat and strong aluminum winding handle with large metal finger hold, giving a winding leverage of nearly five inches, and enabling the winding of a long tape with exceptional ease and rapidity. A leather strap for carrying is attached to one end of the frame.

The Cripple Creek Reel is the neatest, lightest, most convenient, easiest working, most durable reel for long steel tapes made. Weight, 4½ lbs.

Price of Cripple Creek Reel.....Code Word, **GALVAN**

STAFF FOR CRIPPLE CREEK REEL

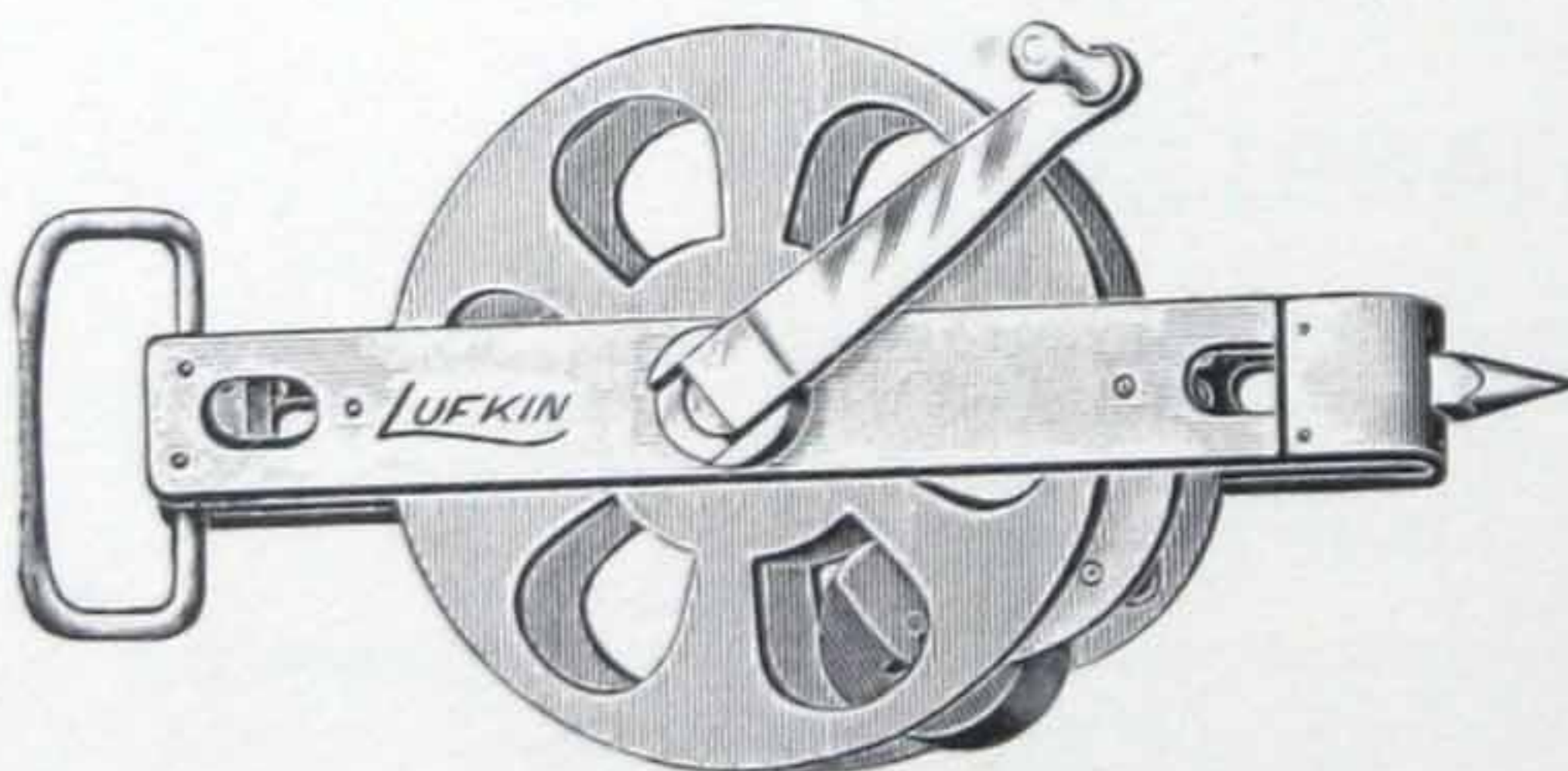
Forty inches long, of hard maple wood; aluminum socket with heavy set screw at one end into which the reel fits and is securely fastened. Other end of staff is tapered by means of a heavy brass ferrule and steel point which can be firmly set into the ground. The great advantage of this staff is that it serves as a complete support in winding or unwinding the tape, and when the reel is not in use, the outfit can be conveniently carried over the shoulder. Weight, 2¼ lbs.

This staff is very strong, but light and very convenient.

Price of Staff only.....Code Word, **GALWICK**

THE 1914 REEL

An All-Steel Lock Handle Reel for Chain Tapes



The winding reel is of 7 inch diameter and frame in which it is mounted is 14 inches long over all. The winding handle gives 5 inches leverage, and locks into either end of the frame, thus holding the tape at any point. Hardwood spring tension roller engages the tape, causing it to wind evenly and tightly. This reel is in dull nickel plated finish. It is of medium weight and will withstand severe use.

No. 1914 reel can be used with any of our chains, and is especially recommended for the longer lengths and the babbitt tapes. Made in three capacities, varying only in width.

In Ordering Always State Length, Width and Style of the Tape to Be Used

No. 1914. Reel, for 100 foot tapes.
No. 1914. Reel, for 200 to 300 foot tapes.
No. 1914. Reel, for 500 foot tapes.

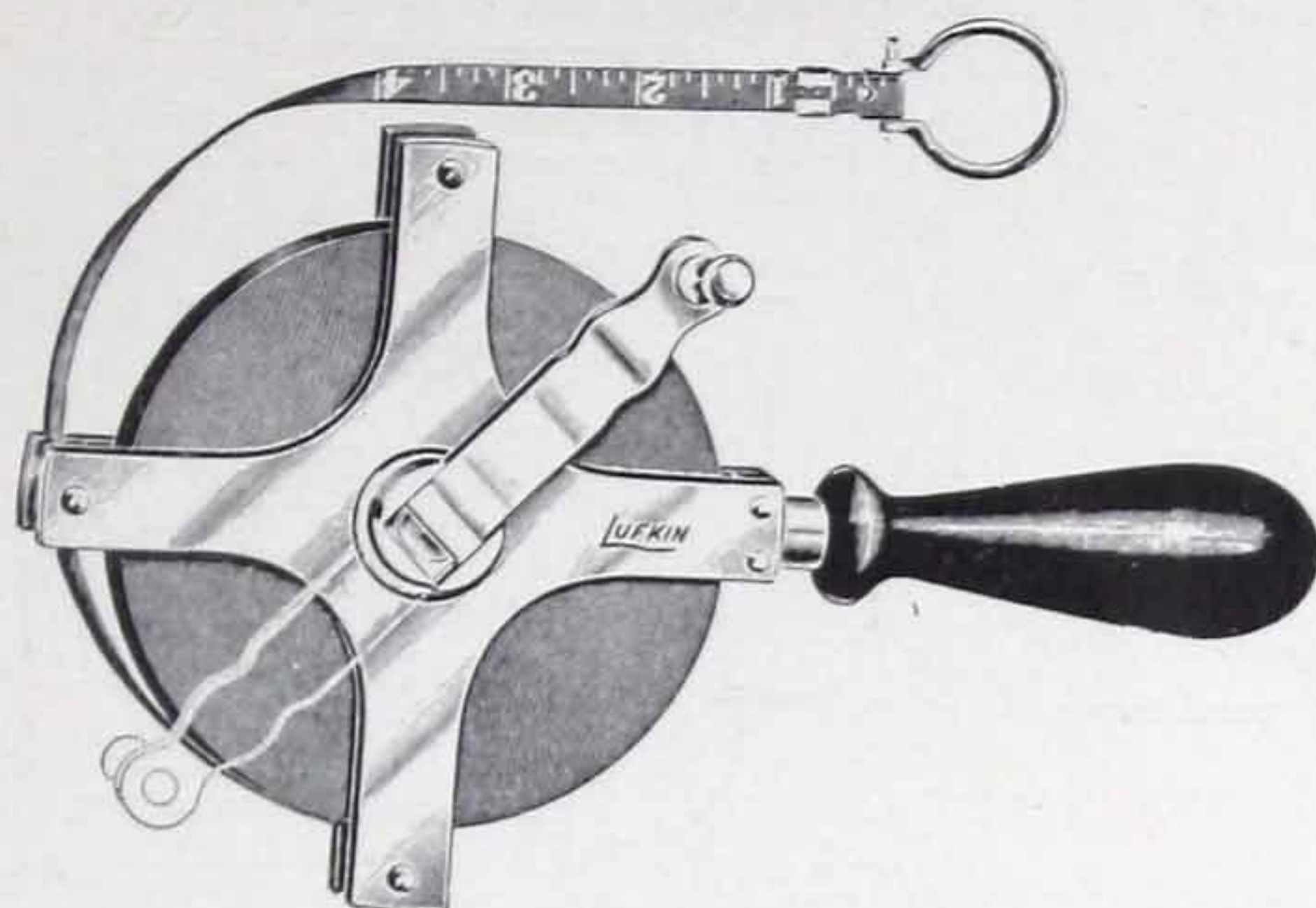
Weight each, 3¾ lbs.....
Weight each, 4 lbs.....
Weight each, 4½ lbs.....

Code Word
GALWIRE
GALWUN
GALWY

SEE PRICE LIST IN BACK OF CATALOG

ENGINEERS' PATTERN (Extra Weight) FRAME STEEL TAPES WITH LOCK HANDLE

(Tape Thickness—Approximately .015 Inch)
 $\frac{1}{4}$ Inch Wide.



A very sturdy engineers' tape. The line is 25 per cent heavier than standard weight engineers' tapes, gives extra durability.

Four-arm, metal frame, with lock handle, i. e., one-piece winding handle which, turned over, engages frame arms and locks line at any point. Frame and its mountings are heavily nickel plated.

With $\frac{1}{4}$ -Inch Engineers' Pattern Tapes, Detachable Rings

Marked
Feet and 12ths
(Inches and Eighths)

No. 1273X.	Code Word
No. 1276X.	GAPEX
	GAPOX

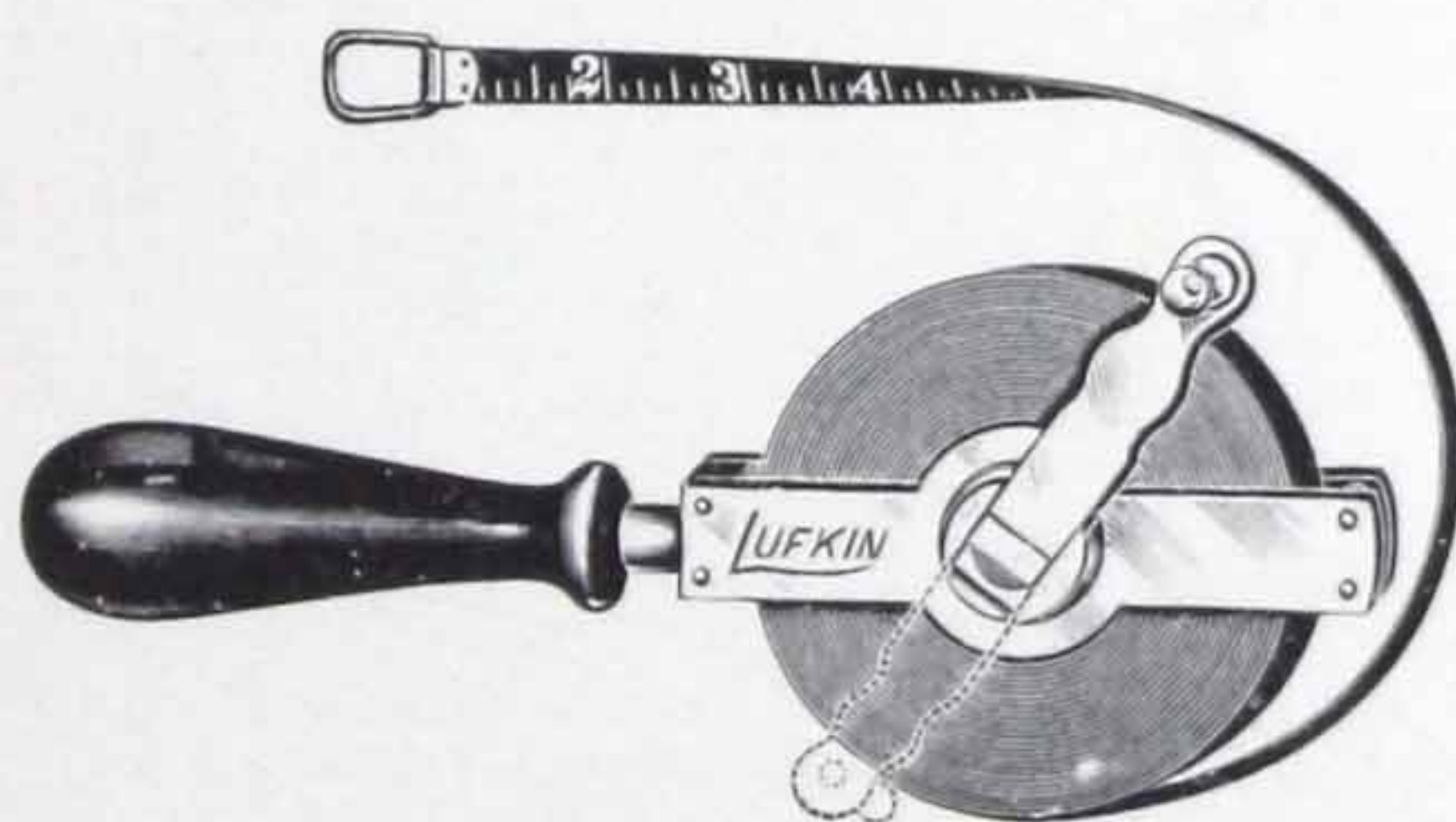
Marked Feet,
10ths and 100ths of feet
for Surveyor's Use

No. 1273DX.	Code Word
No. 1276DX.	GAPRIX
	GAPTOX

Length	Each
50 ft.	
100 ft.	

Lock Handle Frame Steel Tapes

$\frac{3}{8}$ Inch Wide.



With $\frac{3}{8}$ -Inch Tapes, Rings Attached

Marked
Feet and 12ths
(Inches and Eighths)

No. 1283.	Code Word
No. 1286.	GARATER
	GARITE

Marked Feet,
10ths and 100ths of feet
for Surveyor's Use

No. 1283D.	Code Word
No. 1286D.	GARCON
	GARISH

Length	Each
50 ft.	
100 ft.	

Tapes marked metric measure one side only, same price as corresponding length in feet.

Tapes marked feet one side, metric measure on the other, add 2 cents per foot to list price.

SEE PRICE LIST IN BACK OF CATALOG

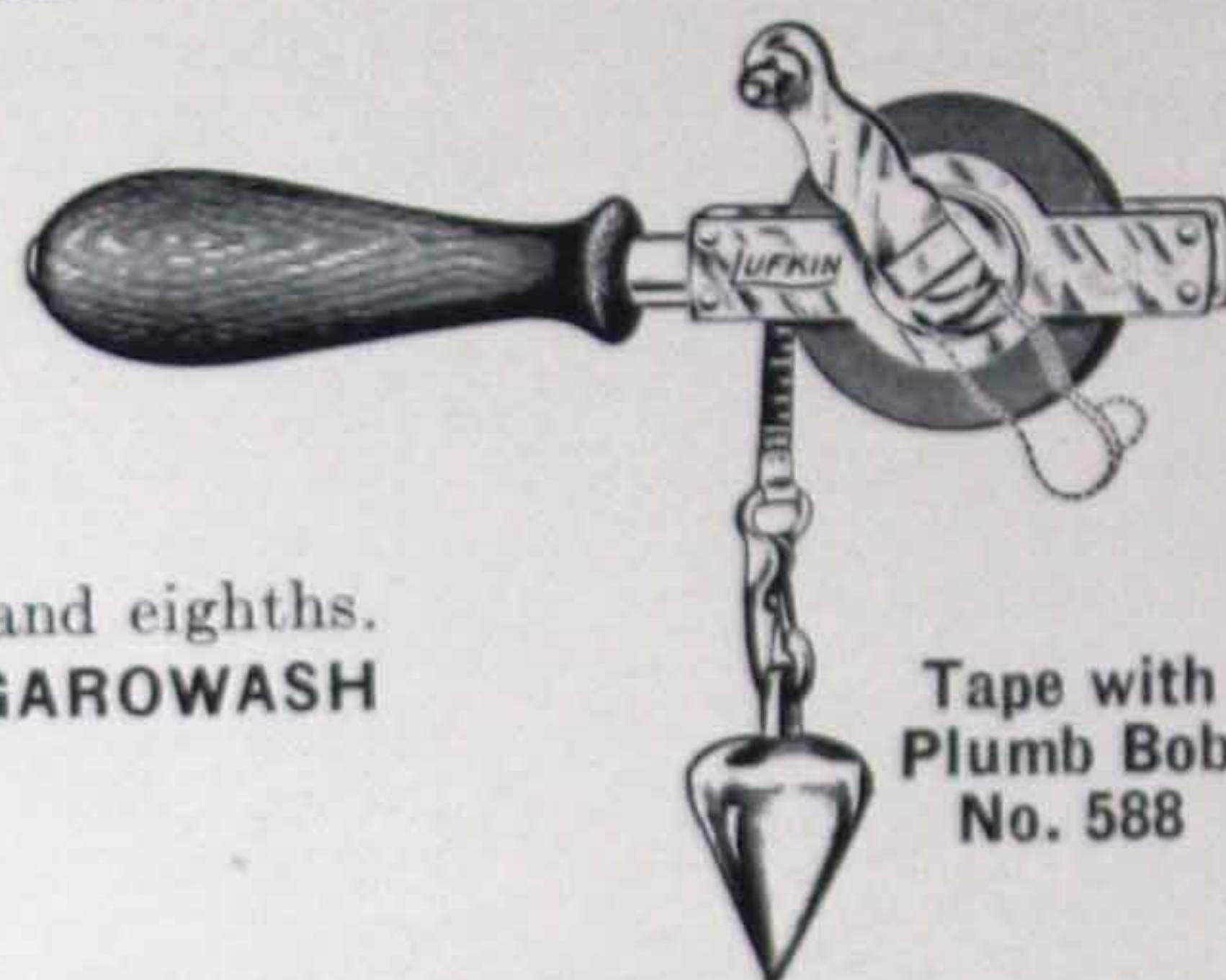
OIL MEASUREMENT TAPES

With plumb bob attachment for gaging oil in tanks. This attachment is included in the measurement of the tape supplied. The tapes are provided with a snap for detaching from bob when not in use.

IN LOCK HANDLE FRAMES

With $\frac{3}{8}$ -Inch Tapes

No. 1283WB. 50 feet, divided feet, inches and eighths.
.....Code Word, **GAROWASH**



Tape with
Plumb Bob
No. 588

PLUMB BOBS FOR STEEL TAPES

(For Oil Gaging Tapes with Bobs See Pages 146-147.)



No. 590



No. 588



No. 589



No. 590G

These Plumb Bobs are extensively used for tank gaging. (Tapes used with them are cut to include bob in measurement, i. e., so zero falls at lower end of bob.)

No. 588 is a 6-ounce, solid brass bob, cone shaped; a weight suitable for the lighter oils, gasoline, etc.Code Word **GARROTE**

No. 589 is a 14-ounce, enameled iron bob, 3-legged, and is interchangeable with No. 588, being same length.**GARROTER**

No. 590 is a 20-ounce, solid brass bob, round, with tapered point, and will penetrate heavy oils, etc.**GARRULIN**

No. 590G is exactly same as No. 590 except graduated inches to 8ths, reading upward, i. e., zero falling at lower end of point.**GARRUNY**

SEE PRICE LIST IN BACK OF CATALOG

"ATLAS" OIL GAGING STEEL TAPES WITH PLUMB BOB

$\frac{1}{2}$ Inch Wide. Sturdiest and Best of All Gaging Tapes.



Extra Heavy
Steel Tape

With Pointed
20-Ounce Plumb Bob

The tapes shown on this page have been especially designed to meet the demand for a practical oil gagers' steel tape, and one that will withstand a great deal of hard usage. The steel line, which is considerably heavier than used in our regular tapes, is mounted on a strong metal frame of special design and is fitted with a round plumb bob $6\frac{3}{4}$ inches long with tapering point and weighing 20 ounces, which is a weight sufficient to penetrate the heaviest of oils such as those that accumulate an asphalt deposit, etc.

Fitted with a lock handle which folds over the tape, enabling one to stop and hold it at any desired length, and as this handle is extra long and winding drum extra large, it affords increased winding leverage, which, together with the large knob, makes it especially convenient and easy winding. The length of the bob is included in the markings on the tape and the bob is so attached that it can be quickly removed when not in use. Handle of frame is made of hardwood and is nicely polished.

Tapes Complete with Frame and Bob Marked Feet, Inches and 8ths, One Side Only

Number	Length	Width and Type	Code Word
1290S with 590 "Atlas" Gaging Tape	25 ft.	$\frac{1}{2}$ inch, heavy	GARTA
1291S with 590 "Atlas" Gaging Tape	33 ft.	$\frac{1}{2}$ inch, heavy	GARTER
1293S with 590 "Atlas" Gaging Tape	50 ft.	$\frac{1}{2}$ inch, heavy	GARTH
1294S with 590 "Atlas" Gaging Tape	66 ft.	$\frac{1}{2}$ inch, heavy	GARTIP

Lines Only for Above "Atlas" Gaging Tapes Fitted for but without Bob, and without Frame

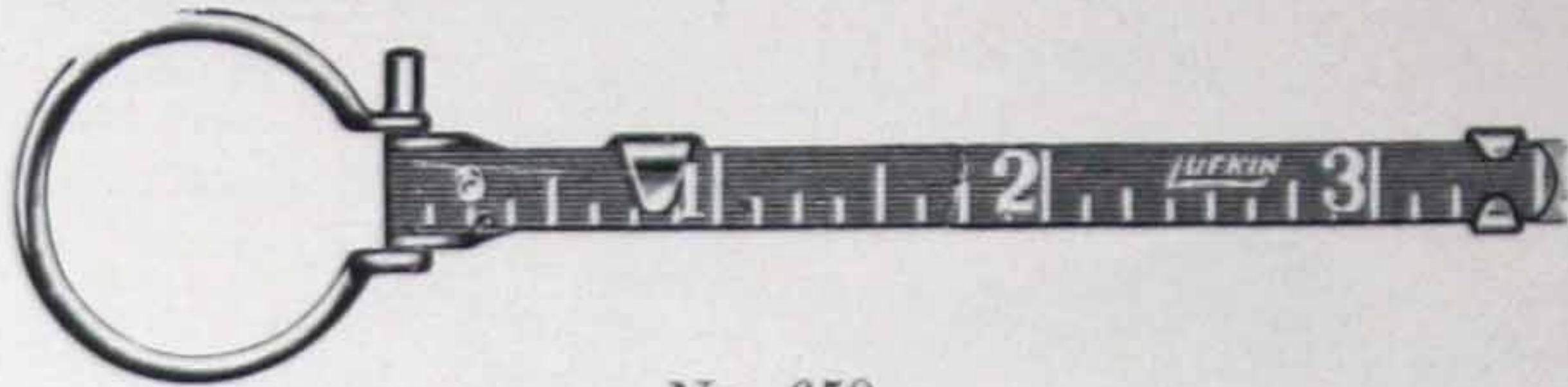
25 ft. "Atlas" Gaging Line Only.	No. 01290S for 590	GARTOLE
33 ft. "Atlas" Gaging Line Only.	No. 01291S for 590	GARTOOL
50 ft. "Atlas" Gaging Line Only.	No. 01293S for 590	GARTON
66 ft. "Atlas" Gaging Line Only.	No. 01294S for 590	GARTOWN

Metric Only—"Atlas" Tapes so marked, prices same as feet and inches.

Other Plumb Bobs—Any of our plumb bobs shown page 146 can also be supplied with "Atlas" Tapes. Price basis: Difference in price of bobs only.

SEE PRICE LIST IN BACK OF CATALOG

ATTACHMENTS FOR ENGINEERS' TAPES
EXTRA DETACHABLE RINGS OR HANDLES



No. 650

A detachable ring of improved type, for Engineers $\frac{1}{4}$ inch Tapes. It is a sturdy, $1\frac{1}{8}$ inch round finger ring. Flexible tape strip of this ring extends $3\frac{1}{2}$ inches along back of tape line and aids greatly to prevent sharp kinking and breaking of line.

No. 650. Engineers' Tape Ring.....

Code Word
GAMY



Nos.
626-629

TENSION HANDLES

For applying exact tension at which a steel tape is standard. Brass, nickel plated.

	Capacity	Diam. and Length	Code Word
No. 626.	30 lbs. by $\frac{1}{2}$ lbs.	$\frac{5}{8}$ in. by $4\frac{3}{8}$ in.....	GANGPLANK
No. 627.	40 lbs. by $\frac{1}{2}$ lbs.	$\frac{3}{4}$ in. by 8 in.....	GANGWAY
No. 628.	50 lbs. by $\frac{1}{2}$ lbs.	$\frac{7}{8}$ in. by 9 in.....	GANGER
No. 629.	60 lbs. by $\frac{1}{2}$ lbs.	$\frac{7}{8}$ in. by $9\frac{1}{2}$ in.....	GANGLION

McCULLOUGH TAPE LEVEL



No. 635

No. 635. McCullough Tape Level insures accuracy in measurements with steel tapes. It is used by clamping to the tape, about one foot from the handle, by means of the two springs shown, and can be attached and detached instantly. Price.....Code Word, **GANGUE**

No. 636. Thermometer and Level in nickel-plated case to attach to tape at any point.....Code Word, **GANGWARD**

For Pocket Thermometers see page 107.

SEE PRICE LIST IN BACK OF CATALOG

STAINLESS STEEL TAPES

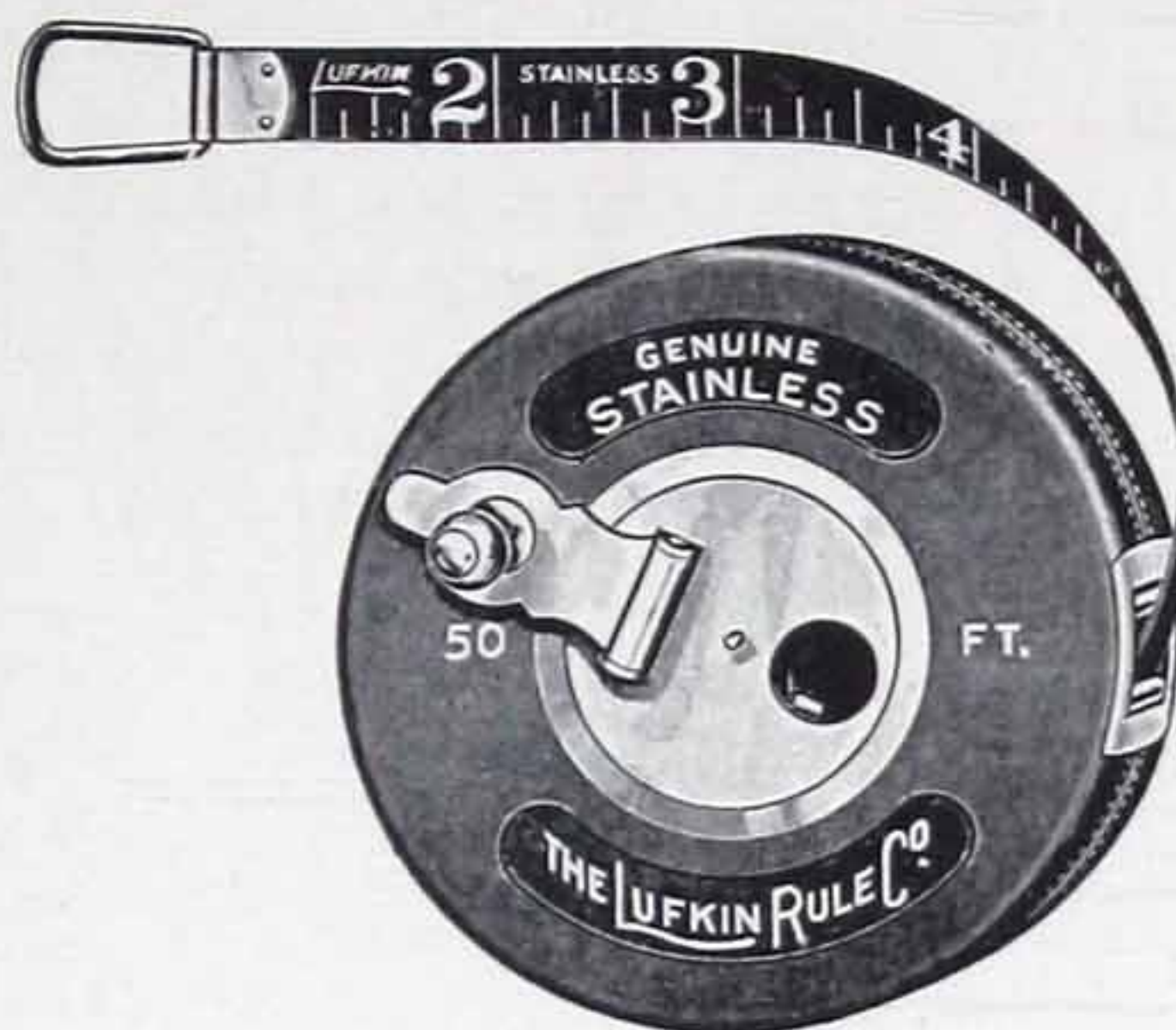
RUST PROOF

NON-CORROSIVE

STAINLESS TAPES ARE IDEAL FOR USE WHEREVER CONDITIONS COMMONLY CAUSING RUST OR CORROSION ARE PRESENT

The lines in these tapes are of standard weight and of Genuine Stainless Steel, rust proof and non-corrosive. This material also is of suitable temper for tapes, in that respect closely approaching ordinary tape steel. Our Stainless Steel Tapes hold their shape well, far better than lines made of other rust proof materials such as phosphor bronze and monel metal. The tapes below have Instantaneous Readings, and "Nubian" Finish, aids to accurate and quick reading.

The cases are of selected genuine leather, hand-stitched, and with substantial plated steel liners. Folding flush handle is opened by pressing pin on opposite side. Trimmings nickel plated. Measurements guaranteed accurate.



IN LEATHER CASES

ENGINEERS' PATTERN STAINLESS STEEL TAPES

$\frac{1}{4}$ Inch Heavy Tapes with Detachable End Rings

Marked Feet and 12ths (Inches and Eighths)	Code Word	Marked Feet, 10ths and 100ths of feet, for Surveyor's Use	Code Word	Length
No. S233.	GARWALL	No. S233D.	GARWIN	50 ft.
No. S236.	GARWEST	No. S236D.	GARWOT	100 ft.

$\frac{3}{8}$ INCH STAINLESS STEEL TAPES

(Challenge Pattern)

Marked Feet and 12ths (Inches and Eighths)	Code Word	Marked Feet, 10ths and 100ths of feet, for Surveyor's Use	Code Word	Length
No. S260.	GASAR	No. S260D.	GASKET	25 ft.
No. S263.	GASBOX	No. S263D.	GASLOG	50 ft.
No. S265.	GASBURN	No. S265D.	GASMAN	75 ft.
No. S266.	GASCOCK	No. S266D.	GASPIN	100 ft.

STAINLESS STEEL TAPES ON METAL ARM FRAMES
And Other Types

NOTE:—We can supply $\frac{3}{8}$ " and $\frac{1}{2}$ " wide Stainless Steel Tapes also in "Reliable" pattern leather cases, and in metal arm frames. If interested ask for quotations.

INSTANTANEOUS READINGS



Instantaneous Readings, a patented system of marking steel and metallic tapes, consists of repeating the foot marks at every inch in small, yet easily distinguishable figures. Thus the total reading is brought directly before the eye, eliminating all chance of possible error, and saving valuable time.

SEE PRICE LIST IN BACK OF CATALOG

ENGINEERS' PATTERN (Extra Weight) STEEL TAPES

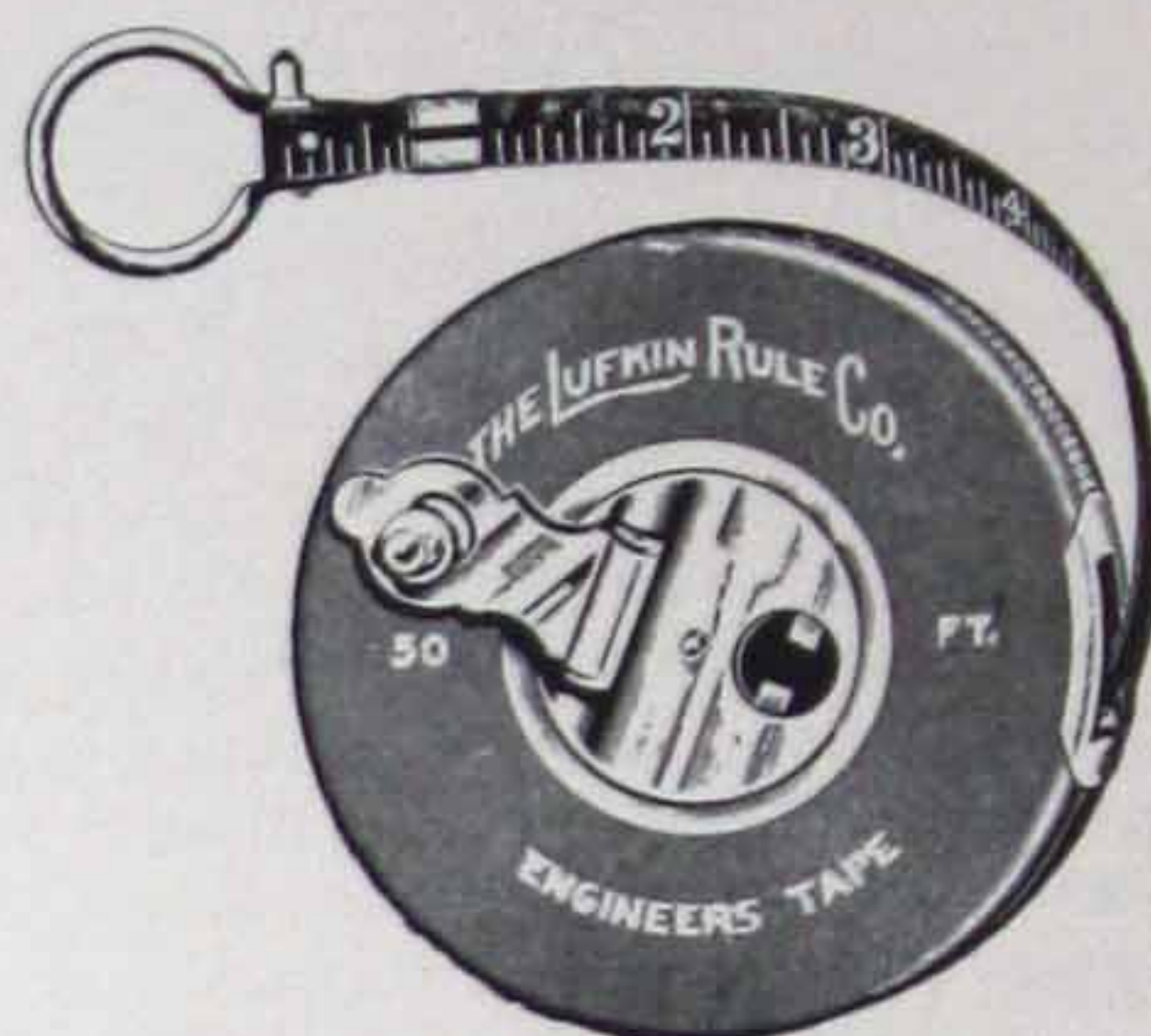
(Tape Thickness—Approximately .015 Inch)

$\frac{1}{4}$ Inch Wide

An engineers' sturdy tape and leather case; line 25% heavier than standard weight engineers' tapes, giving extra durability. Convenient to carry.

Line of highest grade tape steel, distinctly marked, with zero point at extreme end of tape. It is readily removed from case and is supplied with two detachable finger rings. It has "Instantaneous" Readings and "Nubian" Finish. Measurements guaranteed accurate.

The case is narrow and of brown, selected, genuine leather, with substantial plated steel liner. Folding flush handle is opened by pressing pin on opposite side. Mountings nickel plated.



Marked
Feet and 12ths
(Inches and Eighths)

	Code Word
No. 233X.	GATACK
No. 235X.	GATAG
No. 236X.	GATALE

Marked Feet,
10ths and 100ths of feet,
for Surveyor's Use

	Code Word	Length
No. 233DX.	GATEL	50 ft.
No. 235DX.	GATEST	75 ft.
No. 236DX.	GATIN	100 ft.

Tapes divided metric system on back add 2c per foot.

"WOLVERINE" STEEL TAPES

Instantaneous Readings



The lines in these tapes are the same as above, 25% heavier than standard weight engineers' tapes, with two detachable finger rings. The substantial disc wheel is constructed of light weight rust-proof metal, one side perforated to aid in clearing the tape of dirt and in drying it out. One piece lock winding handle engages cut-away in wheel and locks the line at any point. This handle with its large knob and great length gives good grip and extra leverage. Adjustable leather strap handle.

Marked
Feet and 12ths
(Inches and Eighths)

	Code Word
No. 1373X.	GATLER
No. 1376X.	GATLIN

Marked Feet,
10ths and 100ths of feet,
for Surveyor's Use

	Code Word	Length
No. 1373DX.	GATMAN	50 ft.
No. 1376DX.	GATMIRE	100 ft.

For prices of Lines only, see page 155

SEE PRICE LIST IN BACK OF CATALOG

"RELIABLE" STEEL MEASURING TAPES

Instantaneous Readings

$\frac{3}{8}$ -Inch Wide



Marked
Feet and 12ths
(Inches and Eighths)

Marked Feet,
10ths and 100ths of feet,
for Surveyor's Use

	Code Word
No. 200.	GAUD
No. 203.	GAUDERY
No. 205.	GAUGY
No. 206.	GAUKER

	Code Word	Length
No. 200D.	GAULY	25 ft.
No. 203D.	GAUNT	50 ft.
No. 205D.	GAUPE	75 ft.
No. 206D.	GAUST	100 ft.

Hook-Ring on $\frac{3}{8}$ Inch Wide Steel Tapes



POSITION OF HOOK WHEN NOT IN USE

Can Be Supplied on Any of Our $\frac{3}{8}$ Inch Wide Steel Tapes.

Enables One Man to Take Many Measurements Unassisted.

Specify by prefixing "H" to stock number of tape, as "H-263 Challenge,"
"H-543 Universal," etc.

Extra.....Code Word, GAYHOO

TAPE HOOKS

For attaching to steel tapes. Measures from inside of hook.

No. 654.	For $\frac{1}{4}$ -inch tapes.....	Code Word
No. 655.	For $\frac{3}{8}$ -inch tapes.....	GANDER
		GANDRY



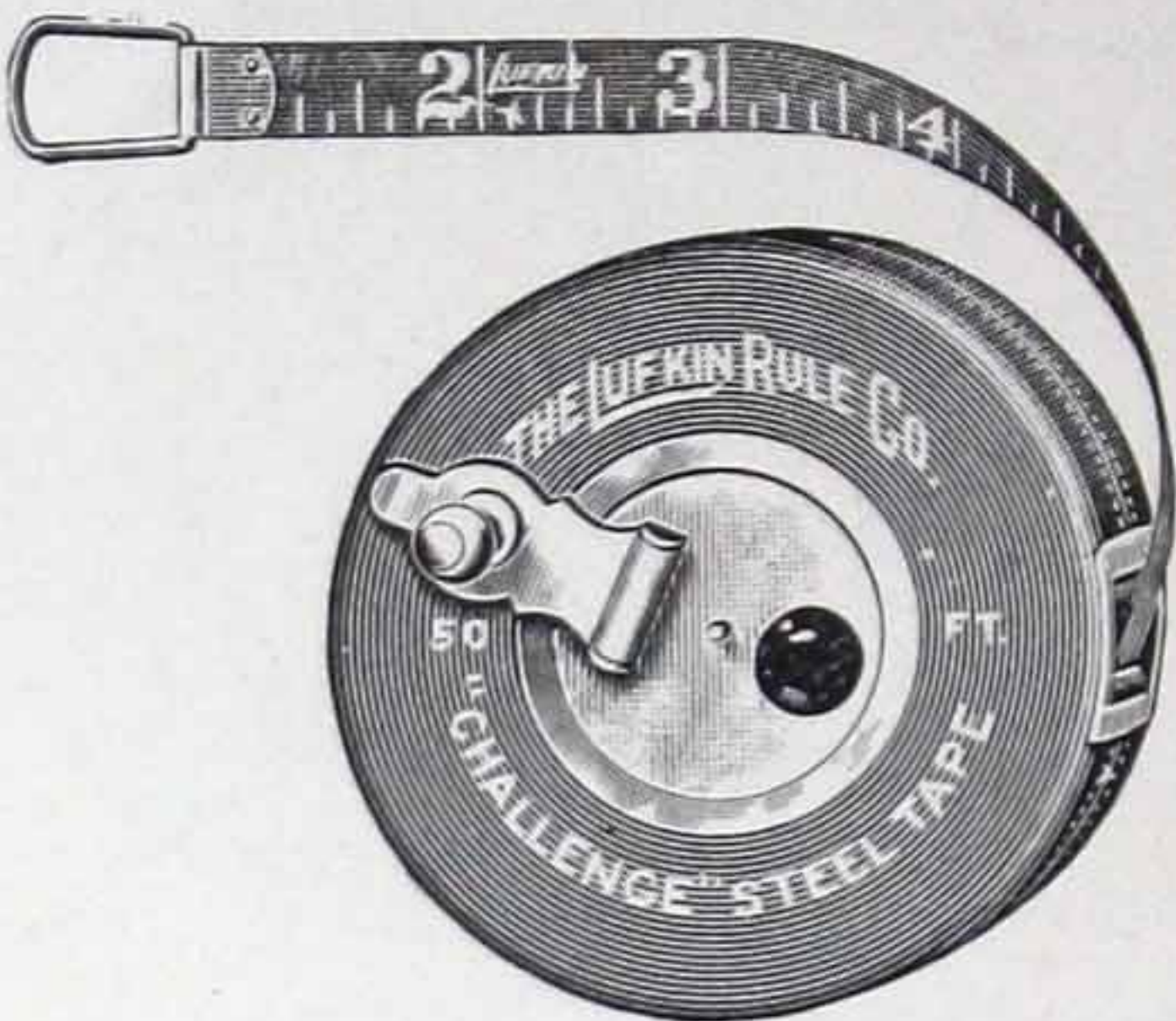
Nos. 654-655

This hook when attached to the first end of a steel tape enables one person to take long as well as short measurements readily.

SEE PRICE LIST IN BACK OF CATALOG

CHALLENGE STEEL MEASURING TAPES

Instantaneous Readings
3/8-Inch Wide



Marked
Feet and 12ths
(Inches and Eighths)

Marked Feet,
10ths and 100ths of feet,
for Surveyor's Use

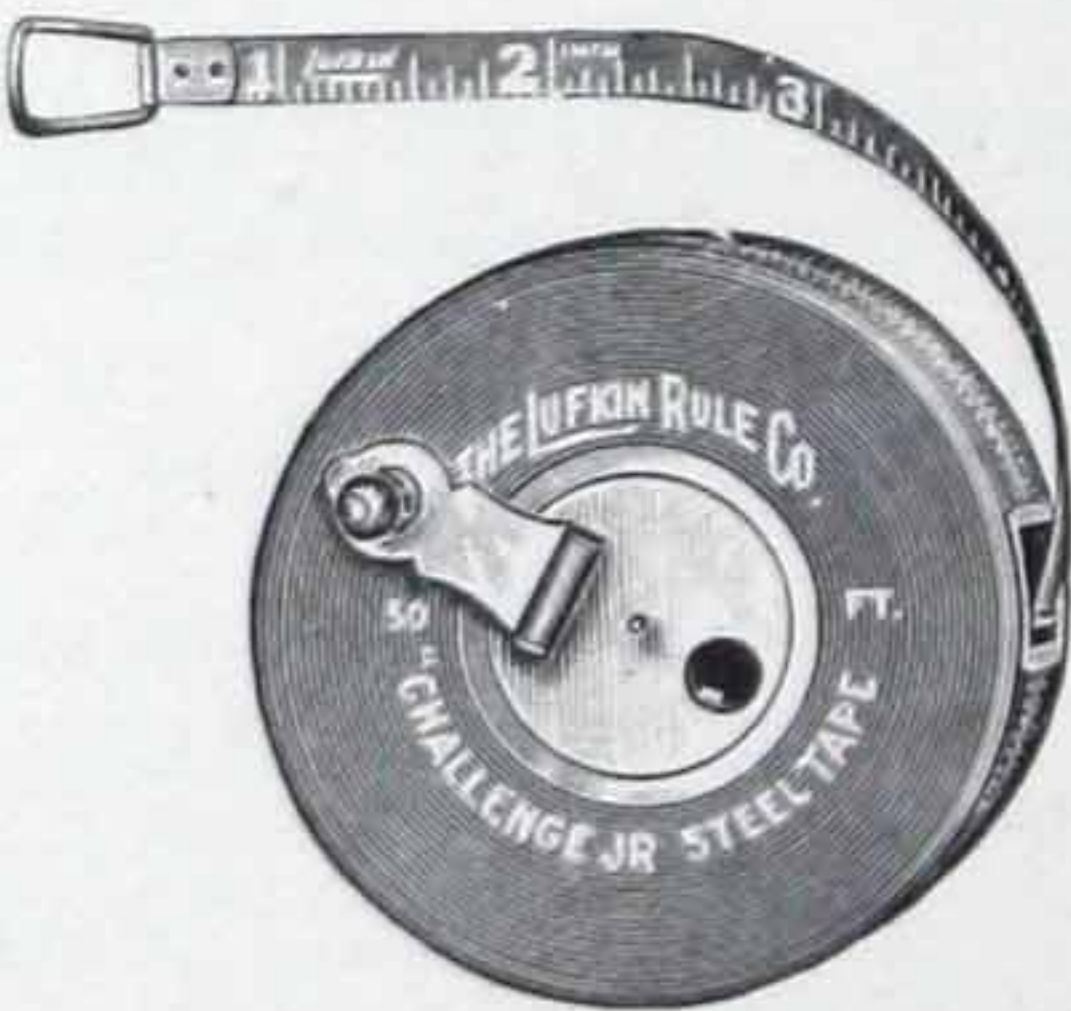
	Code Word		Code Word	Length
No. 260.	GEARY	No. 260D.	GEBA	25 ft.
No. 263*.	GEAST	No. 263D*.	GECKO	50 ft.
No. 265.	GEATO	No. 265D.	GEDDY	75 ft.
No. 266*.	GEAWIN	No. 266D*.	GELO	100 ft.

*Nos. 263 and 266 can be furnished marked feet and 12ths on one side and feet and 100ths on the back or with metric measure on back.

		CodeWord
No. 263DOB.	50 feet (decimals).....	GELD
No. 263MOB.	50 feet (metric).....	GELIDY
No. 266DOB.	100 feet (decimals).....	GELOSE
No. 266MOB.	100 feet (metric).....	GEMEL

CHALLENGE JUNIOR STEEL MEASURING TAPES

Instantaneous Readings
1/4 Inch Wide



Marked
Feet and 12ths
(Inches and 16ths)

Marked Feet,
10ths and 100ths of feet,
for Surveyor's Use

	Code Word		Code Word	Length
No. 1260.	GEMIN	No. 1260D.	GENAR	25 ft.
No. 1263*.	GEMMU	No. 1263D*.	GENDER	50 ft.

*No. 1263 can be furnished marked feet and 12ths on one side and feet and 100ths on the back or with metric measure on back.

		Code Word
No. 1263DOB.	50 feet (decimals).....	GENESIS
No. 1263MOB.	50 feet (metric).....	GENIE

SEE PRICE LIST IN BACK OF CATALOG

"CHALLENGE" TREE TAPES

$\frac{3}{8}$ -Inch Wide



Give at Direct Reading Diameter as Well as Circumference of the Tree

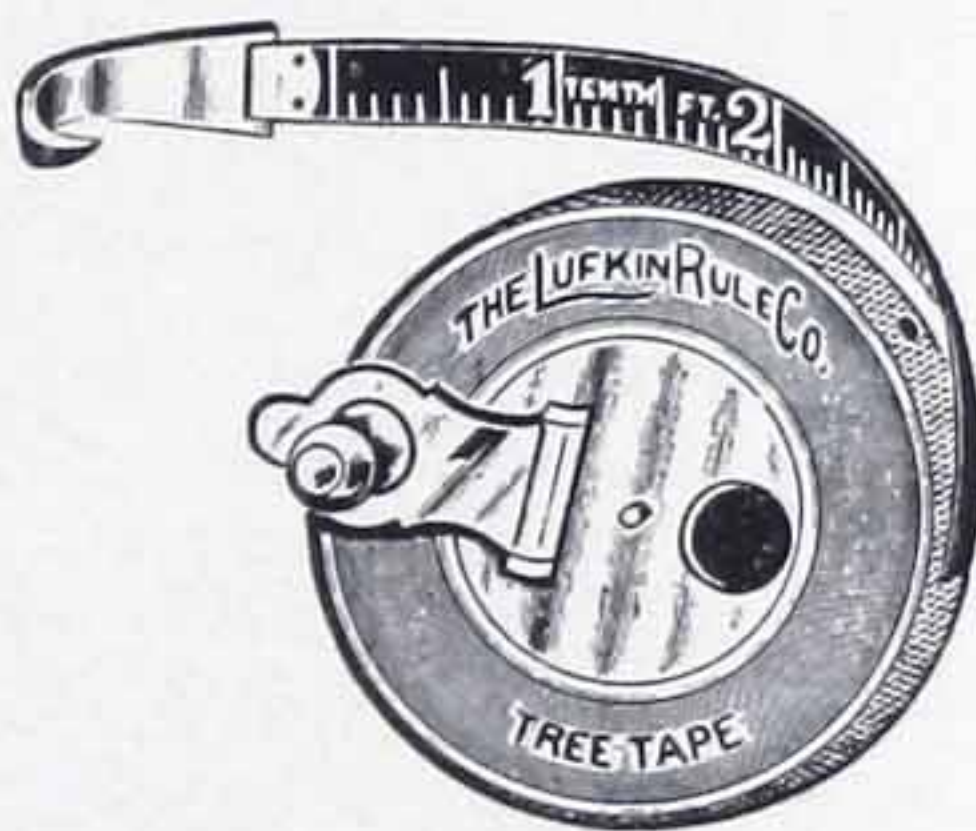
Used by the United States Forest Service, as well as by private foresters, and in ranger schools, etc. Three-eighths inch wide highest grade steel line in "Nubian" Finish. Marked on front side standard feet, 10ths and 100ths of feet, "Instantaneous" Readings; other side diameter equivalents of circumferences in diameter feet, inches and 10th of inches. First end has blank space and is fitted with tree peg or spike, which folds down for convenience in carrying. Case same as the "Challenge," of brown, selected, genuine leather, with plated steel liner and with folding flush handle opened by push pin.

No. 261TP.	Length, 33 feet.....	Code Word
No. 263TP.	Length, 50 feet.....	GESTAL
		GESTURE

"ARTISAN" TREE TAPE

"Nubian" Finish

$\frac{3}{8}$ -Inch Wide



This item is standard equipment of United States foresters. The steel line is marked on the front 20 feet in feet, 10ths and 100ths of feet, on the back in diameter equivalents of circumferences in consecutive diameter inches and 10ths of inches up to 76 inches. Blank space first end. Tape is fitted with a pointed metal hook for catching bark of trees. Put up in nickel plated steel case with knurled edge, affording a firm grip. Hole in edge of case into which point of hook fits for protection in carrying. Folding flush handle is opened by pressing pin on opposite side.

No. 120TP.	Length, 20 feet.....	Code word, GEYSER
------------	----------------------	--------------------------

TAPES WITH DIAMETER MEASUREMENTS

In Leather Cases

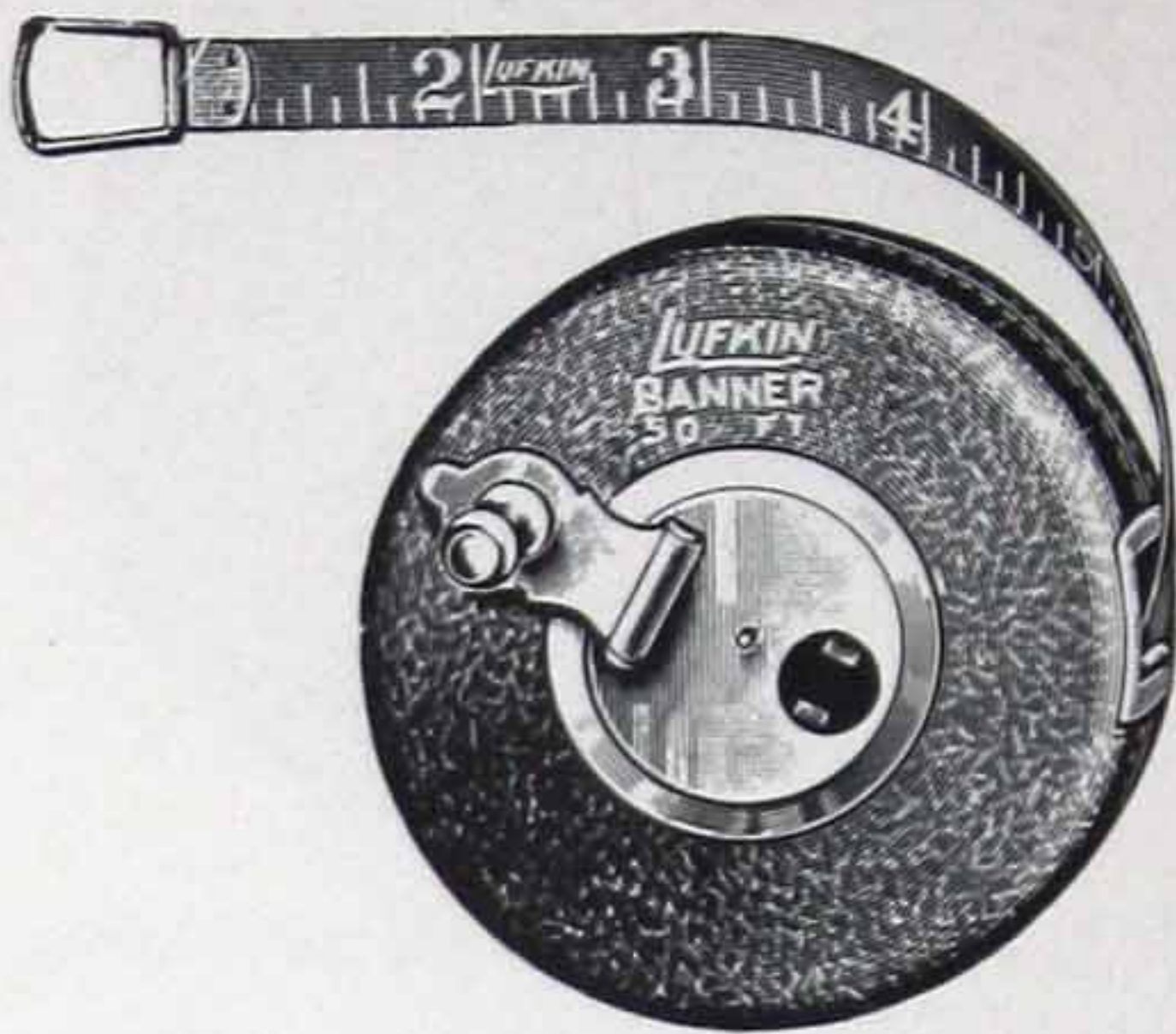
These tapes are marked on one side in feet, inches and 8ths, other side with diameter measurements in feet, enabling one, by measuring the circumference, to arrive at the exact diameter as fine as 64ths of inches.

No. 261P.	33 feet with diameter measurement.....	Code Word
No. 263P.	50 feet with diameter measurement.....	GERRALL
		GERRY

SEE PRICE LIST IN BACK OF CATALOG

“BANNER” STEEL MEASURING TAPES

Instantaneous Readings
3⁄8-Inch Wide



Cases made of steel, covered with handsome mottled black “Autoleather,” extremely durable. Fitted with folding flush handle, opened by pressing button on opposite side. Trimmings nickel plated.

Marked Feet and 12ths (Inches and Eighths)	Code Word	Marked Feet, 10ths and 100ths of feet, for Surveyor's Use	Code Word	Length
No. 550.....	GIANT	No. 550D.....	GIAX	25 feet
No. 553.....	GIBBER	No. 553D.....	GIB	50 feet
No. 556.....	GIBBON	No. 556D.....	GIBAT	100 feet

“Universal” Steel Tapes

3⁄8-Inch Wide



Strong Metal Case, covered with Fabrikoid, fitted with folding handle. Nickel plated trimmings.

GRADUATED IN FEET, INCHES AND EIGHTHS ONLY.

		Code Word
No. 540.	25 feet.....	GIBCO
No. 543.	50 feet.....	GIBCUF
No. 546	100 feet.....	GIBCULL

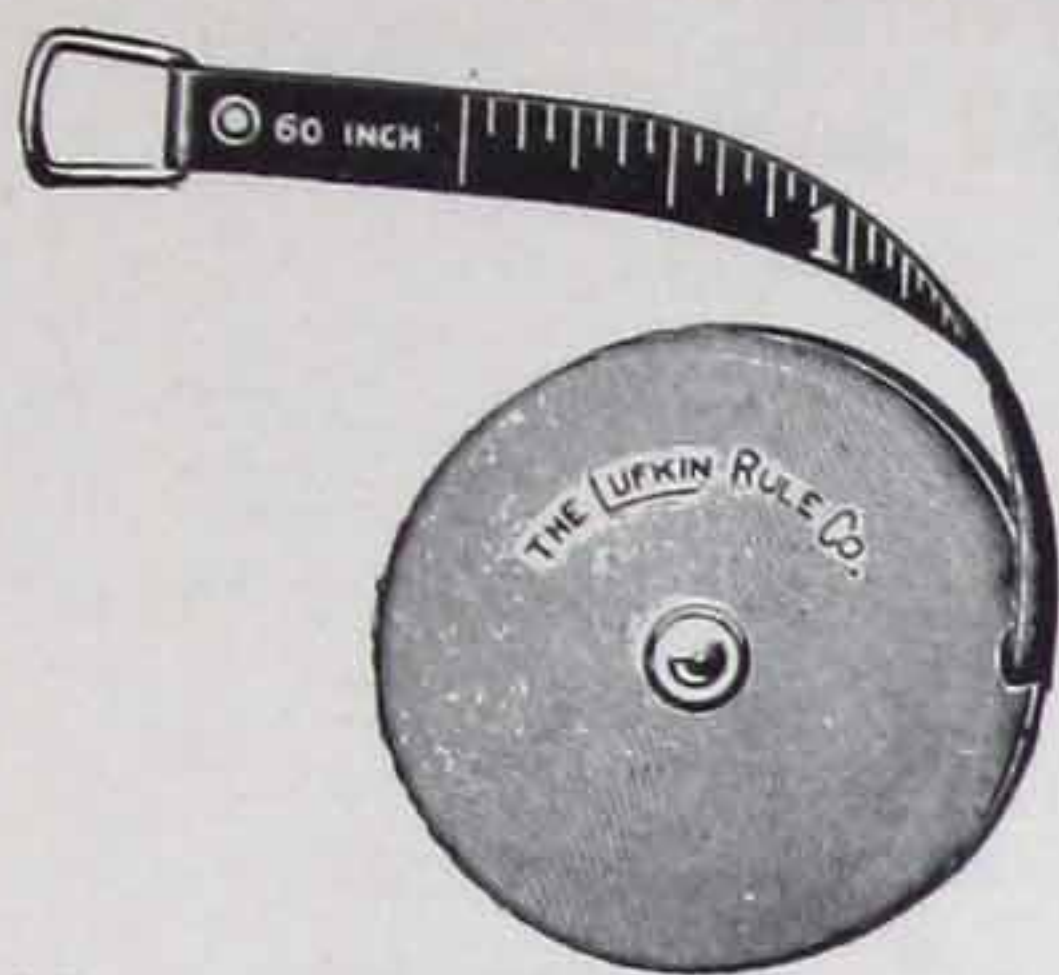
REPAIRS TO STEEL TAPES

We are prepared to give prompt and satisfactory service.

- A—Repairing Pocket Tapes—per break.....
- B—New End Ring, ordinary type.....
- C—New End Ring, engineers' pattern.....
- D—Extra Tape furnished, per foot.....
- E—Repairing Band Chains, per break.....
- F—New End Ring for band chains.....
- G—Extra Tape furnished, per foot.....

Pocket Spring Steel Tapes cannot be mended except at ends.

SEE PRICE LIST IN BACK OF CATALOG



POCKET SPRING STEEL TAPES

$\frac{1}{4}$ -Inch Wide

Give long and satisfactory service. Flexible, finely tempered steel line, clearly marked and with "Nubian" Finish. Metal case heavily nickel plated, compact and neat yet sturdy. Spring-wind with center push button and ratchet stop.

Marked Inches to 16ths, One side Only

No.....	143	145	146	148
Length, inches.....	36	60	72	96
Code Word.....	GIBE	GIBLET	GIBBER	GIBBOSE

Marked Feet, 10th and 100ths of Feet One Side; Inches to 16ths Other Side

No.....	143D	145D	146D	148D
Length, feet.....	3	5	6	8
Code Word.....	GIDER	GIDING	GIG	GILD

Marked Inches to 16ths One Side; Millimeters Other Side

No.....	143EM	145EM	146EM	148EM
Length, inches.....	36 (1 meter)	60 (1½ meter)	72 (2 meter)	96 (2½ meter)
Code Word.....	GIMBAL	GIMLET	GIMP	GINNY

POCKET STEEL TAPES WITH ARCHITECTS' SCALES

- No. 391. 60-inch, marked in $\frac{1}{8}$ inch architect's scale, 1 to 480, Code Word
one side; inches to 16ths other side..... **GINGER**
- No. 392. 60-inch, marked in $\frac{1}{4}$ inch architect's scale, 1 to 240,
one side; inches to 16ths other side..... **GINGHAM**
- No. 393. 60-inch, marked in $\frac{1}{8}$ inch architect's scale one side;
 $\frac{1}{4}$ inch architect's scale other side..... **GINGKO**

Steel Tape Refills

(Tape Lines Only, without Cases or Reels.)

Specify as "Refills" and by Prefixing Zero to Stock Number of Complete Tape.
Example: No. 0263, or 0263D, or 0263ME "Challenge" Tape Refill.

$\frac{1}{4}$ Inch Wide, Light Weight "Junior" Refills

For "Reliable Jr." and "Challenge Jr."

Length feet.....	25	50
Length, meters.....	..	15
Marked one side.....	Each	....
Marked both sides.....	Each	....

$\frac{1}{4}$ by .015 Inch Engineers "Extra Weight" Refills. (With detachable rings)

For Series 233-X, 1373-X and 1273-X, also D and ME.

Length, feet.....	50	75	100
Length, meters.....	15	..	30
Marked one side.....	Each	....	....
Marked both sides.....	Each	....	....

$\frac{1}{4}$ by .020 Inch Engineers "Heavy" Refills or Lines Only are Listed on page 141
with corresponding tapes complete.

$\frac{3}{8}$ Inch Wide Steel Tape Refills

For Series 200 "Reliable," 260 Challenge," 1283 Frame Tapes, also D and ME.

Length, feet.....	25	33	50	75	100	150	200
Length, meters.....	7½	10	15	22	30	..	..
Marked one side.....	Each	....	....	....	....	....	....
Marked both sides.....	Each	....	....	....	....	....	....

$\frac{3}{8}$ Inch Wide Stainless Steel Tape Refills

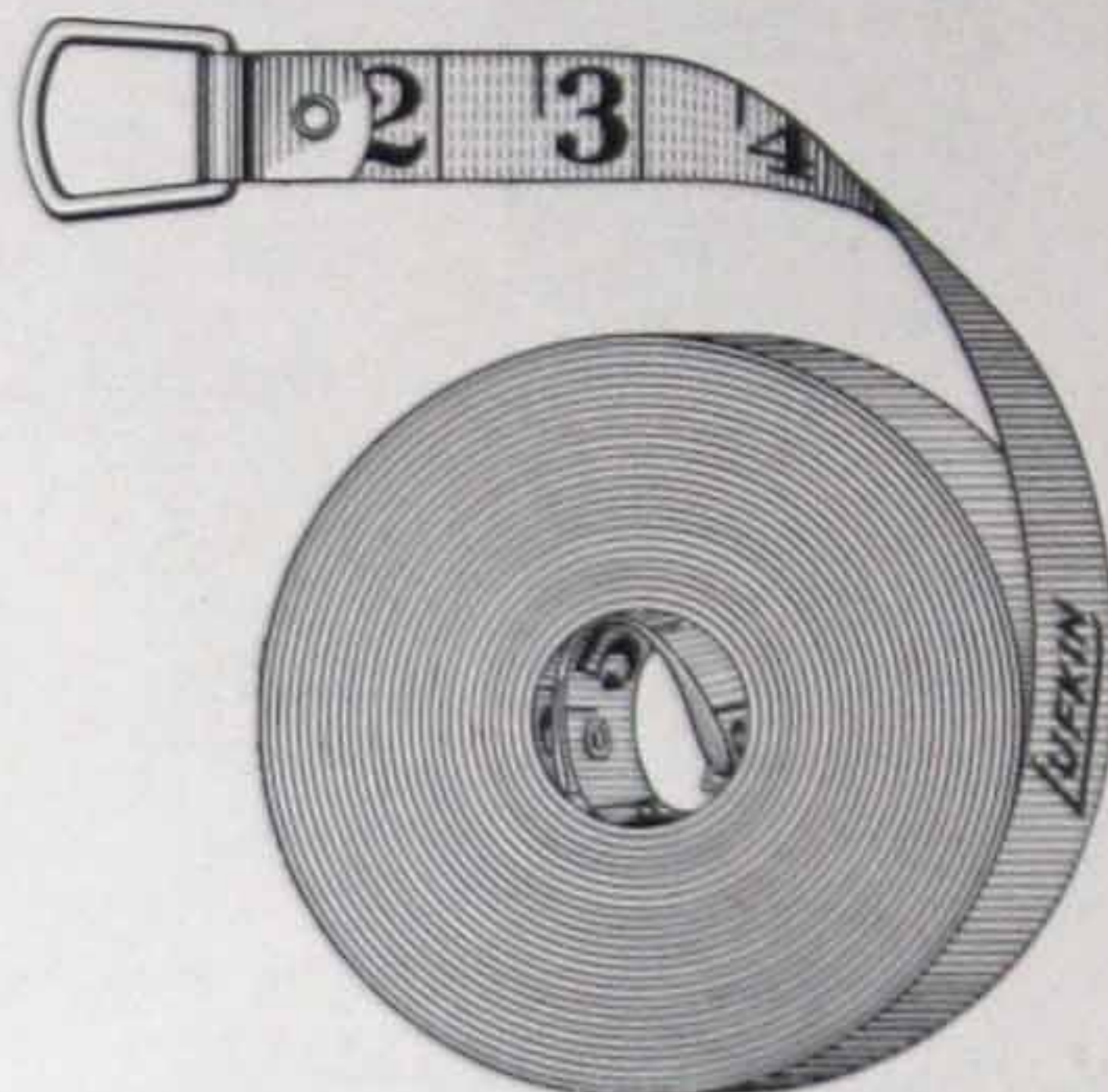
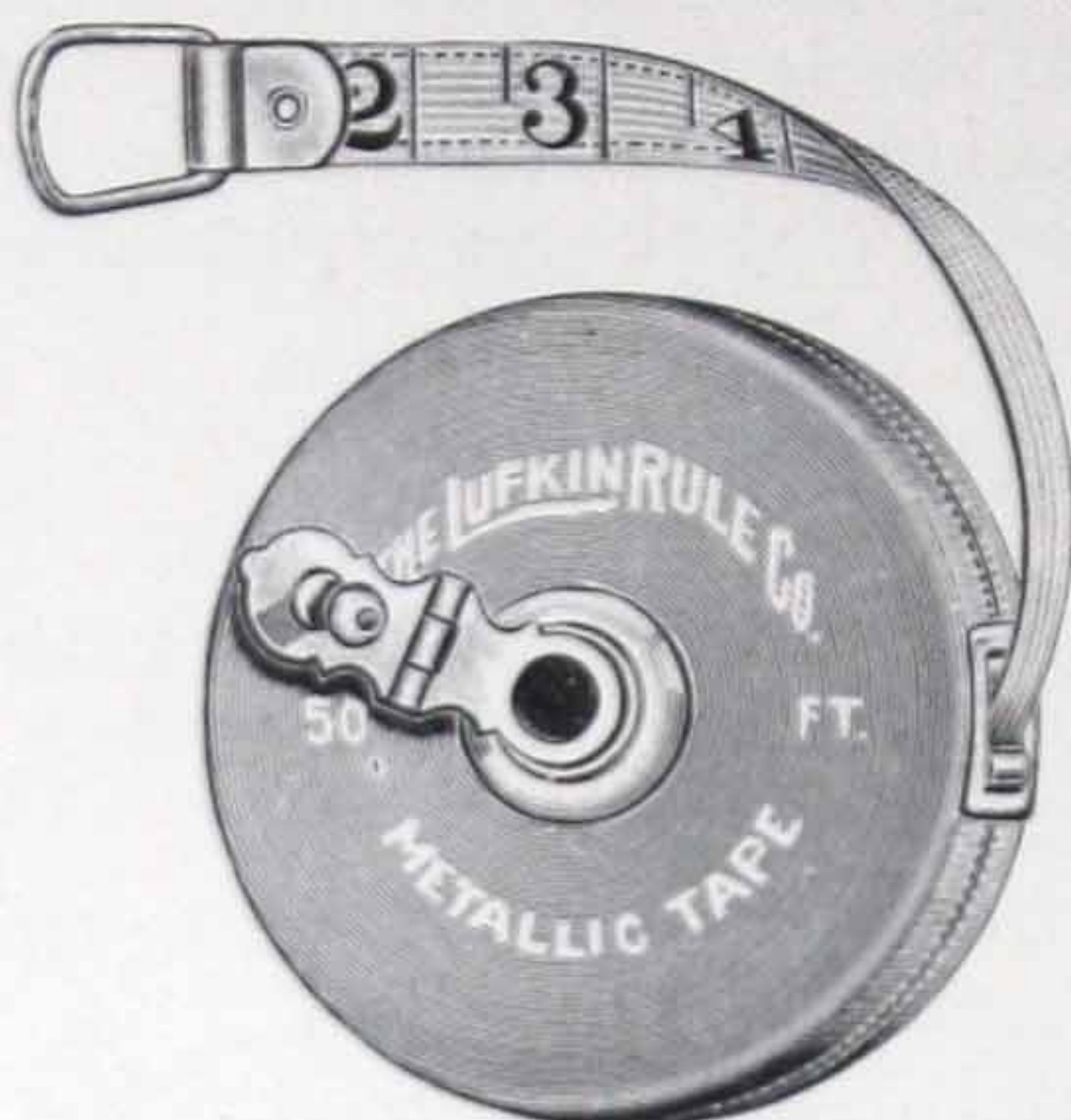
For Series S-260, also D and ME, and same stainless tapes of other series.

Length, feet.....	25	50	75	100
Length, meters.....	7½	15	..	30
Marked one side.....	Each	....	....	....
Marked both sides.....	Each	....	....	....

SEE PRICE LIST IN BACK OF CATALOG

METALLIC MEASURING TAPES

Folding Handle— $\frac{5}{8}$ -Inch Tapes. Instantaneous Readings



Hard leather cases, folding handles, nickel-plated trimmings. Tape $\frac{5}{8}$ inch wide, made of best woven linen with metallic warp. We guarantee our Metallic Tapes to be less liable to shrink or stretch than any others.

Marked One Side Only

Marked Feet and 12ths	Code Word	Marked Feet and 10ths	Code Word	Length
No. 500.	GLOAM	No. 500D.	GLOAMING	25 ft.
No. 503.	GLOBAL	No. 503D.	GLOBATE	50 ft.
No. 505.	GLOBI	No. 505D.	GLOBIN	75 ft.
No. 506.	GLOBULE	No. 506D.	GLOBULIN	100 ft.

Marked Two Sides

Feet and 10ths, and Links on back	Code Word	Feet and 12ths, and Centimeters on back	Code Word	Length
No. 503DL.	GLOME	No. 503 ME.	GLONO	50 ft. or 15 meters
No. 506DL.	GLORIA	No. 505 $\frac{1}{2}$ ME.	GLORIOLE	25 meters
		No. 506 ME.	GLORY	100 ft. or 30 meters

Tapes marked with feet on back instead of links, or with any two measurements listed above, will be supplied at prices of corresponding tapes marked both sides.

METALLIC TAPE REFILLS

METALLIC TAPE LINES ONLY, WITHOUT CASES

$\frac{5}{8}$ Inch Wide—Marked One Side Only

Marked Feet and 12ths	Code Word	Marked Feet and 10ths	Code Word	Length Feet
No. 0500.	GLOSSA	No. 0500D.	GLOSSARY	25
No. 0503.	GLOTTAL	No. 0503D.	GLOTTIS	50
No. 0505.	GLUCOSE	No. 0505D.	GLUTEN	75
No. 0506.	GLUTTON	No. 0506D.	GLYCOL	100
Marked Metric				Length Meters
0503M.	GNAT			15
0505 $\frac{1}{2}$ M.	GNOME			25
0506M.	GNOSIS			30

Marked Two Sides

Marked Feet and 10ths, Links on back	Code Word	Marked Feet and 12ths, Centimeters on back	Code Word	Length Feet	Length Meters
No. 0500DL.	GOAF			25	
No. 0503DL.	GOAD	No. 0503ME.	GOLF	50	15
No. 0505DL.	GOAL			75	
No. 0506DL.	GOAT	No. 0505 $\frac{1}{2}$ ME.	GONG		25
		No. 0506ME.	GORE	100	30

SEE PRICE LIST IN BACK OF CATALOG

METALLIC MEASURING TAPES

Flush Handle; Instantaneous Readings; $\frac{5}{8}$ -Inch Wide



Hard leather cases, double folding flush handle, opened by pressing pin on opposite side. Tape $\frac{5}{8}$ -inch wide, made of best woven linen, with metallic warp.

Marked One Side,
Feet and 12ths

	Code Word	Length
No. 603.	GLEAM	50 ft.
No. 606.	GLEET	100 ft.

Marked One Side,
Feet and 10ths

	Code Word	Length
No. 603D.	GLEBE	50 ft.
No. 606D.	GLEN	100 ft.

JUNIOR METALLIC MEASURING TAPES

Flush Handle; $\frac{3}{8}$ -Inch Tapes

The Junior Metallic is less than one-half the size and weight of a regular metallic tape. Hard leather cases, double folding flush handle, opened by pressing pin on opposite side. Tape is made of best woven linen with metallic warp.

Marked One Side,
Feet and 12ths

	Code Word
No. 660.	GLIB
No. 663.	GLIDER

Marked One Side,
Feet and 10ths

	Code Word	Length
No. 660D.	GLIDE	25 ft.
No. 663D.	GLIFF	50 ft.

JUNIOR METALLIC TAPE LINES ONLY, WITHOUT CASES

$\frac{3}{8}$ inch Wide

Marked
Feet and 12ths

	Code Word
No. 0660.	GLIM
No. 0663.	GLIMMER

Marked Feet
and 10ths

	Code Word	Length
No. 0660D.	GLINT	25 ft.
No. 0663D.	GLIOMA	50 ft.

"STERLING" LINEN TAPES

$\frac{3}{8}$ -Inch Wide

Popular with Telephone, Telegraph and Other Utility Companies, for Ordinary Work

This line, in general appearance similar to the "Metallic," is without the metallic warp. Hard leather cases with folding handle.

Marked One Side Only

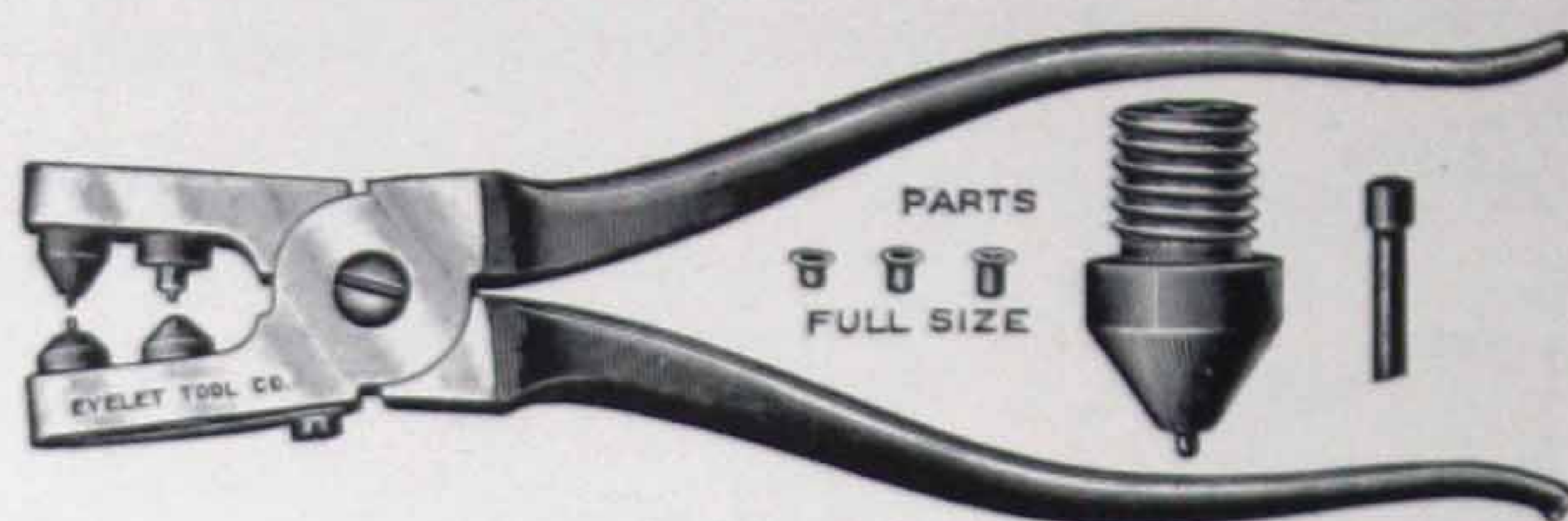
Feet, inches and half inches No.	400	403	406
Length, feet	25	50	100
Code Word	GLIP	GLIPA	GLIPER

Refills for "Sterling" Tapes. (Lines Only, without Cases)

Marked feet and inches, one side No.	0400	0403	0406
Length, feet	25	50	100
Code Word	GLISA	GLISCO	GLIDEN

SEE PRICE LIST IN BACK OF CATALOG

TAPE REPAIRING OUTFITS



No. 675

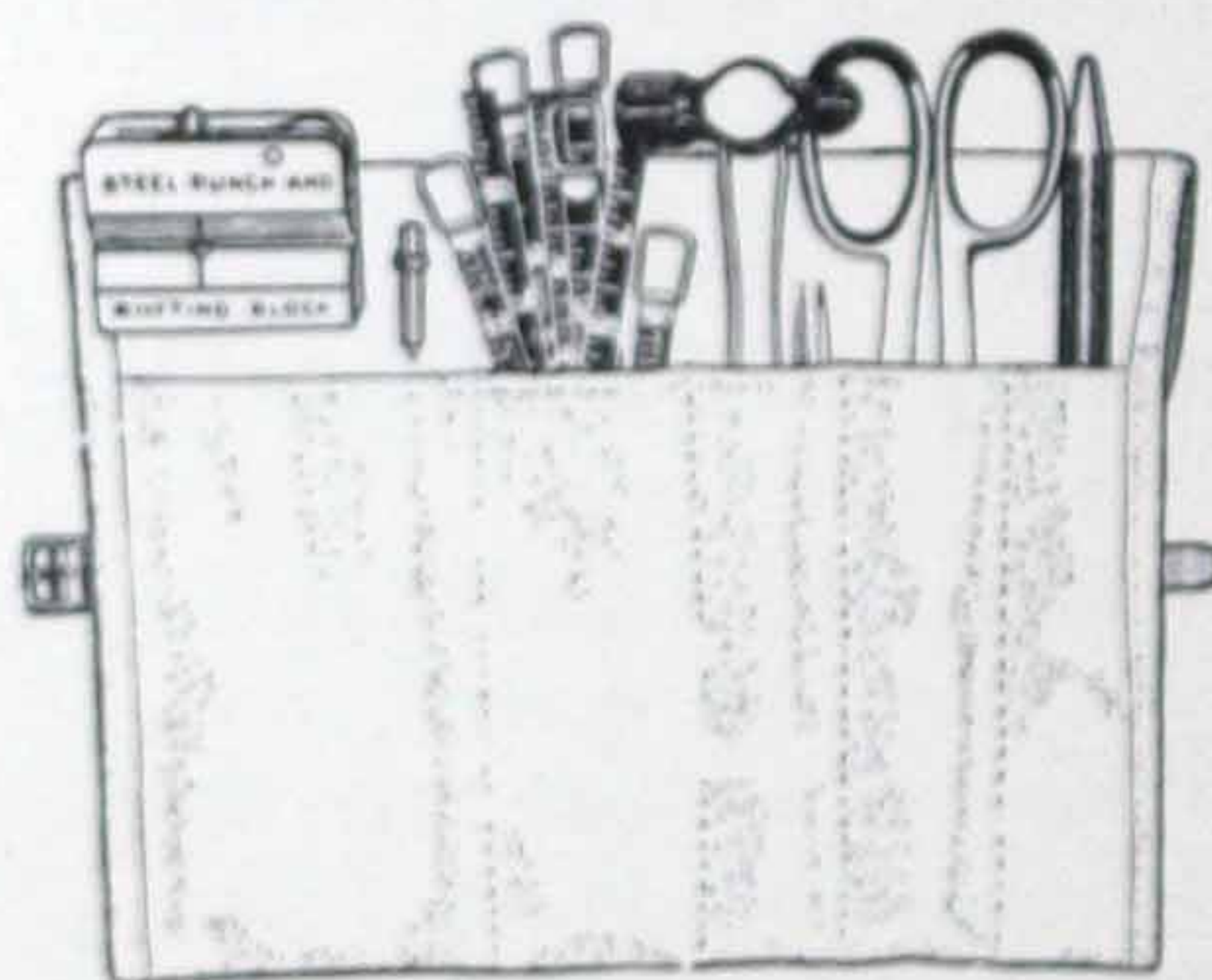
Eyelet Punch and Set combined for repairing steel tapes: Tool, socket, punching pin and three sizes eyelets, shorts, longs and extra longs. Cuts clean hole through pocket steel tapes or band chains without drawing temper; no filing required except to round off the rough corners of the break. Cut first hole, place eyelet on pivot and insert in hole cut, and it is riveted quickly. Five minutes required to make a repair.

Code Word

No. 675.	Tape Mending Outfit complete, with 1M assorted eyelets.....	GLACIER
No. 675A.	Extra Eyelets (when ordering state if Shorts or Longs are wanted), 500 in a package. Price per 1000.....	GLACIS
No. 675B.	Extra Male Punching Dies.....	GLACURE
No. 675C.	Extra Male Setting Dies.....	GLADE
No. 675D.	Extra Female Setting Dies.....	GLADIA
No. 675DD.	Extra Female Punching Dies.....	GLADIATE
No. 675E.	Extra Punching Pins.....	GLADUM
No. 675F.	Extra Escutcheon Pins. Per oz.....	GLAIR
No. 675G.	Three-in-One Oil.....	GLAIVE

Tape Repair Kit

Suitable for Bench or Field Use.



No. 680

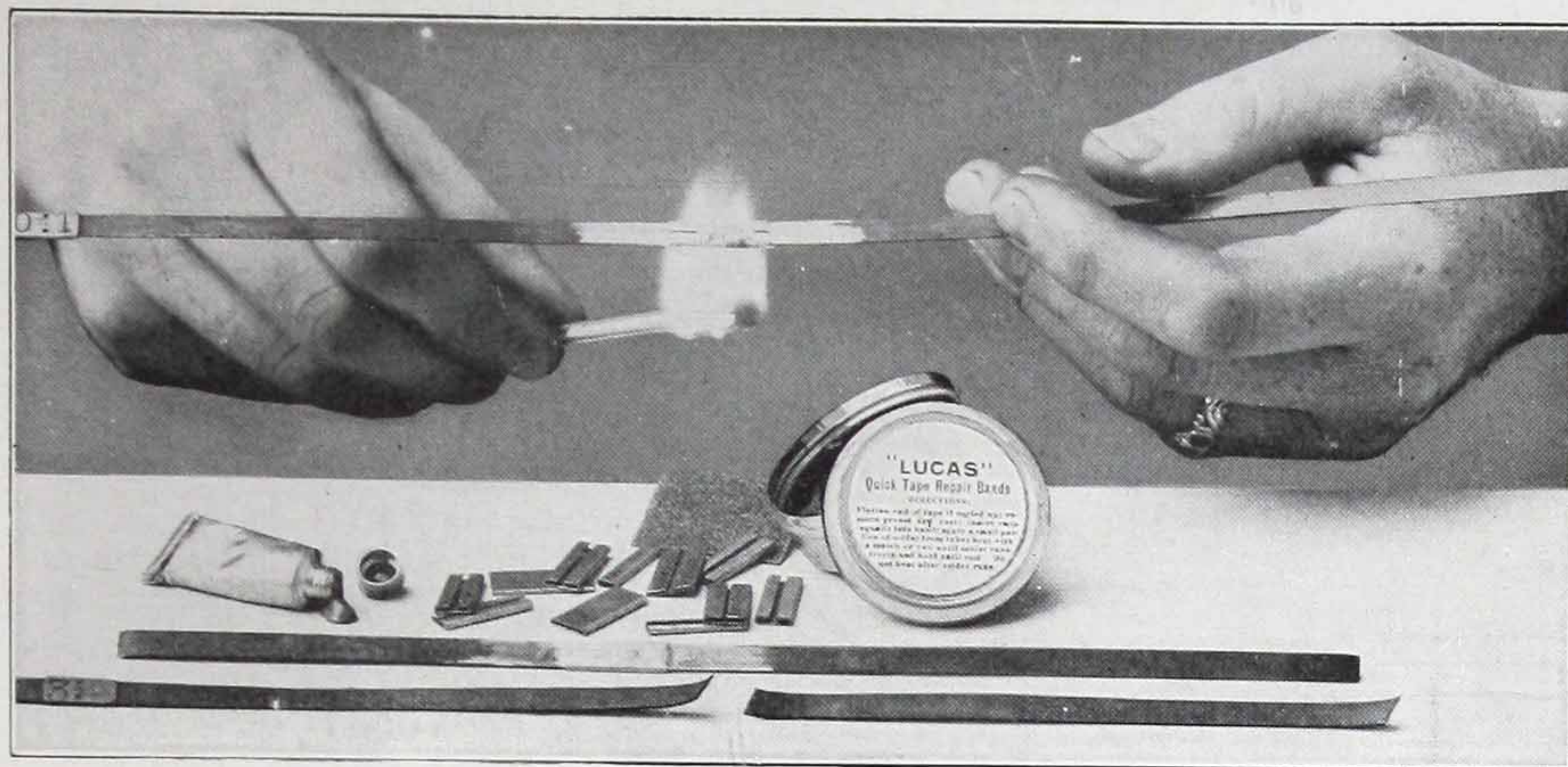
Kit complete is compactly put up in leatherette case with tie strap. It folds to 9x3½x1½ inches and contains the following items:

- | | |
|--|---|
| Steel Punch Block with Punching Plunger (also riveting block). | |
| Pair of Cutting Snips (8-inch). | Pair of Tweezers. |
| Riveting Hammer (8-inch). | Solid Steel Rivets (1,000 in screw top box). |
| Rivet Set. | Extra Punching Plunger (for punch block). |
| Steel Tape Repair Pieces (one lot of various widths, weights and graduations, with and without ring). | |

No. 680. Tape Repair Kit. In Leatherette Case.....Code Word, **GLAMOUR**

SEE PRICE LIST IN BACK OF CATALOG

QUICK TAPE REPAIR BANDS



- No. 685.** "Lucas" Quick Tape Repair Bands furnished with "Lucas" special flux, recommended to be most satisfactory as soldering material does not deteriorate, packed one dozen in a box for 1/8, 3/16, 1/4, and 5/16-inch tapes. State width desired when ordering.
Price per box, with tube of solder..... **GLANDER**
Code Word
Be sure to specify size wanted.

- No. 685A.** Extra Solder, per tube..... **GLANDULE**

- No. 686.** Eureka Tape Repair Bands, one dozen in small wooden box for 1/8, 3/16, 1/4, 3/8, 5/16, 1/2-inch tapes. State width desired when ordering. These splices are coated with a combination of solder and flux, and a lighted match will bring about perfect adhesion between the tape and sleeve.
Price per box..... **GLARE**
Be sure to specify size wanted.

TAPE SPLICES



No. 690

- No. 690.** "Little Giant" Tape Splice for 1/8, 3/16, 1/4, 5/16, 3/8 and 1/2-inch tapes. Each..... **GLASAX**

To repair breaks insert broken ends, adjust by sight hole and turn down screws. Will withstand strongest pull.

SEE PRICE LIST IN BACK OF CATALOG

THE A. LIETZ COMPANY

SAN FRANCISCO, U. S. A.

MODERN ENGINEERS' AND
SURVEYORS' INSTRUMENTS

LIETZ ENGINEERS'

All of our Field Books contain stadia reduction tables, naturals and other handy tables. They are well

- No. 760. Field Book, **Leather binding**, $4\frac{1}{2} \times 7\frac{1}{4}$ in., 80 leaves.....
No. 760F. Field Book, **Fabrikoid binding**, $4\frac{1}{2} \times 7\frac{1}{4}$ in., 80 leaves.....
No. 760S. Students' Field Book, **Paper binding**, $4\frac{1}{2} \times 7\frac{1}{4}$ in., 36 leaves.....
No. 762. Field Book, **Leather binding**, $4 \times 6\frac{1}{2}$ in., 80 leaves.....

- No. 763. Mining Transit Book, **Leather binding**, $4\frac{1}{2} \times 7\frac{1}{4}$ in., right hand page 8×8 to the inch, 80 leaves.
No. 763F. Mining Transit Book, **Fabrikoid binding**, $4\frac{1}{2} \times 7\frac{1}{4}$ in., right hand page 8×8 to the inch, 80 leaves

- No. 764. Engineers' Field Book, **Leather binding**, $4\frac{1}{2} \times 7\frac{1}{4}$ in., right hand page 10×10 to the inch, 80 leaves
No. 764F. Engineers' Field Book, **Fabrikoid binding**, $4\frac{1}{2} \times 7\frac{1}{4}$ in., right hand page 10×10 to the inch, 80
No. 764S. Students' Field Book, **Paper binding**, $4\frac{1}{2} \times 7\frac{1}{4}$ in., 36 leaves.....

SEE PRICE LIST IN BACK OF CATALOG

MODERN ENGINEERS' AND SURVEYORS' INSTRUMENTS

THE A. LIETZ COMPANY

SAN FRANCISCO, U. S. A.

ELD BOOKS

d in strong covers, have sewed backs with cloth reinforcement and will open flat.

.....	Code Word,	HABANA	Per doz.	Each
.....	"	HABANEF	Per doz.	Each
.....	"	HABATO	Per doz.	Each
.....	"	HABAYLO	Per doz.	Each

.....	Code Word, HABEL	Per doz.	Each
.....	" " HABELEF	Per doz.	Each

.....	Code Word,	HABON	Per doz.	Each
.....	"	HABONEF	Per doz.	Each
.....	"	HABONTA	Per doz.	Each

SEE PRICE LIST IN BACK OF CATALOG

SAN FRANCISCO, U. S. A.

MODERN ENGINEERS' AND SURVEYORS' INSTRUMENTS

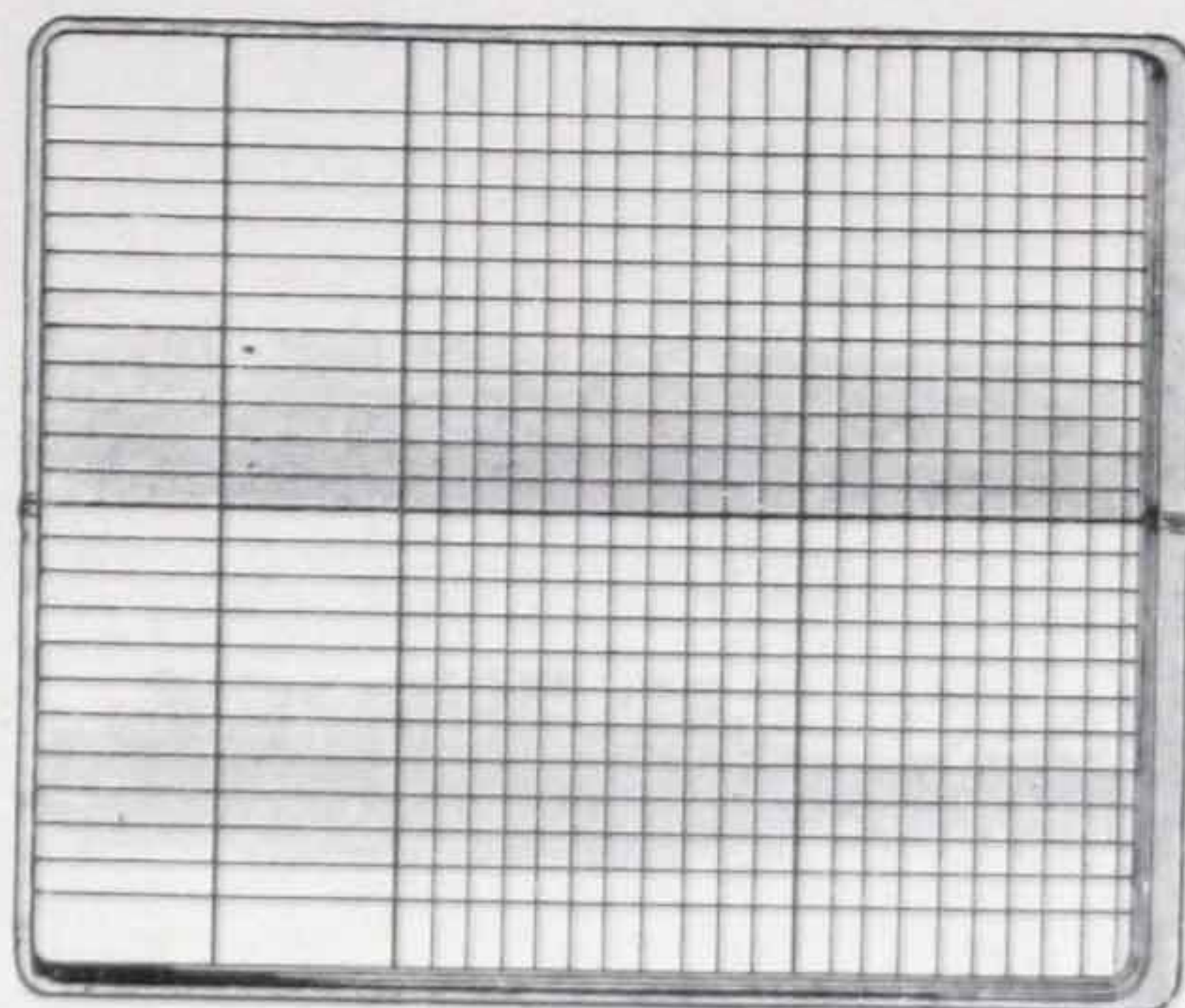
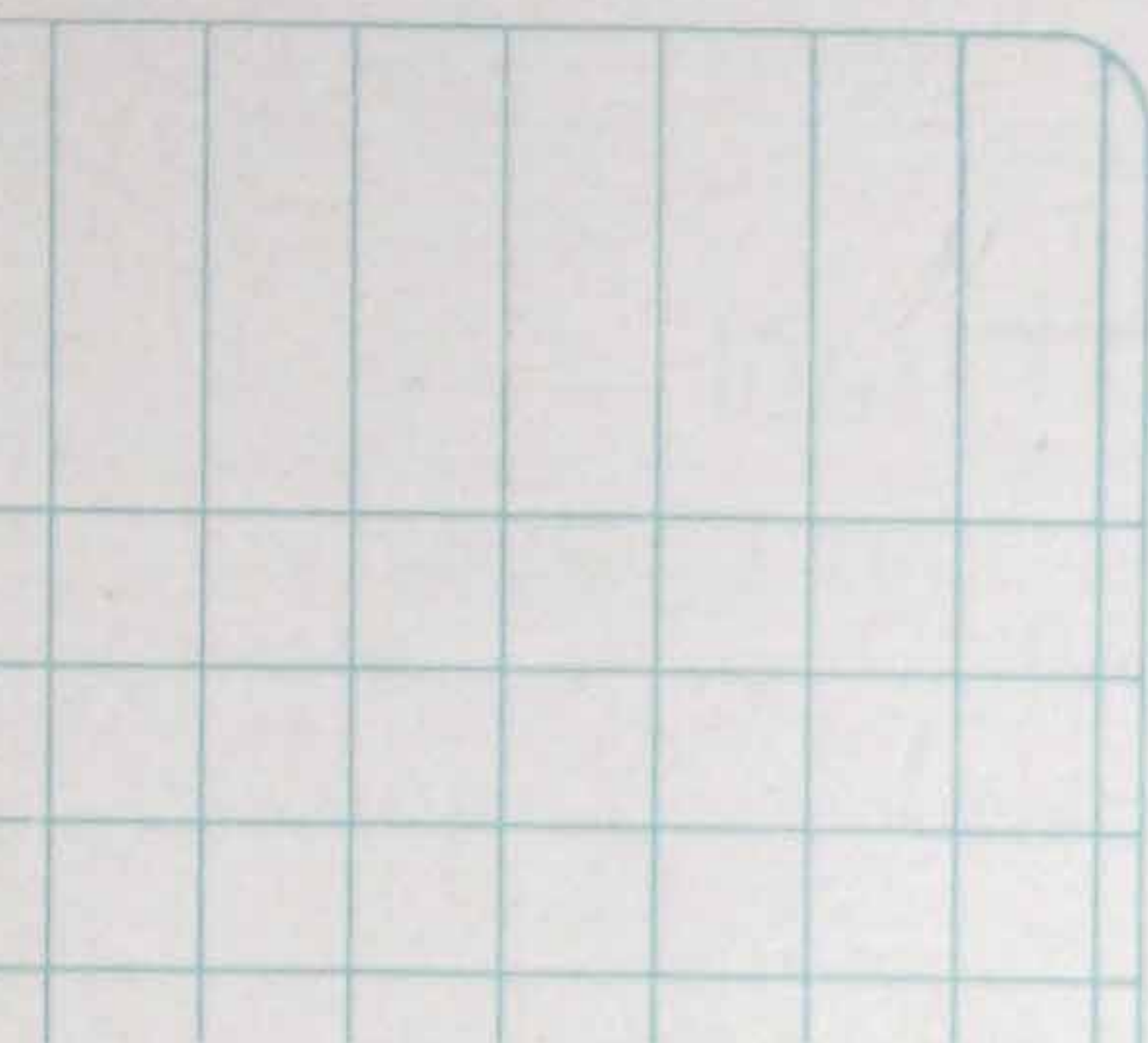
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No. 770. Level Book, **Leather binding**, 4x6½ in., 80 leaves.....
 No. 772. Level Book, **Leather binding**, 4½x7¼ in., 80 leaves.....
 No. 772F. Level Book, **Fabrikoid binding**, 4½x7¼ in., 80 leaves.....

All our Field Books contain stadia

162

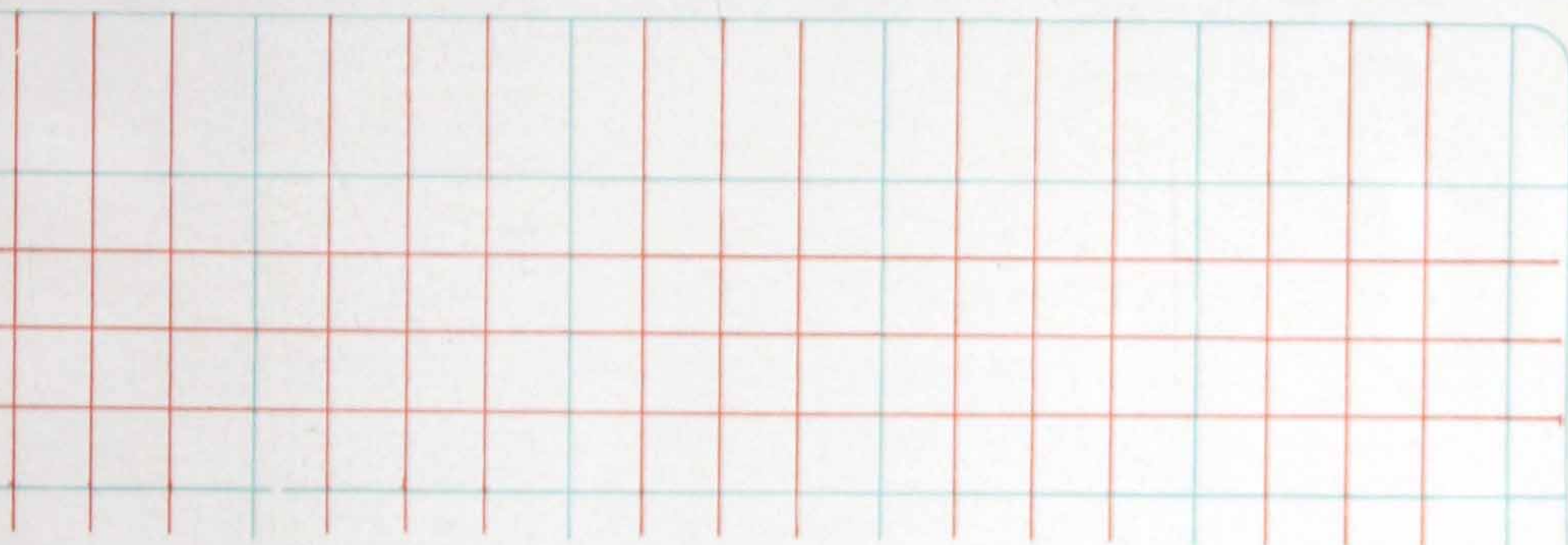
ELD BOOKS



... inch.....Code Word, **HABUL**
horizontal. See illustration to the right.

Per doz.

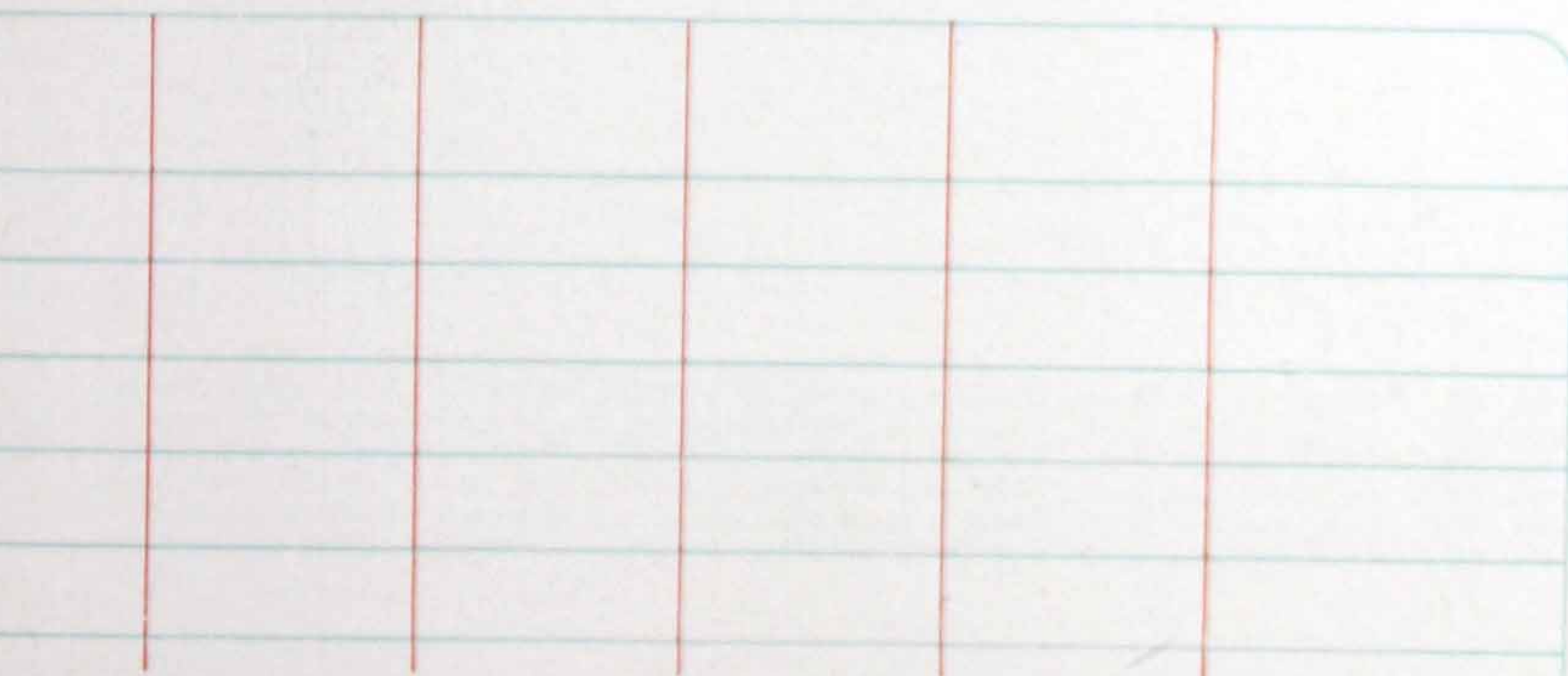
Each



.....Code Word, **HACKER**

Per doz.

Each



.....Code Word, **HACKMAN**
....." " **HACKNEY**
....." " **HACKNEFF**

Per doz.

Per doz.

Per doz.

Each

Each

Each

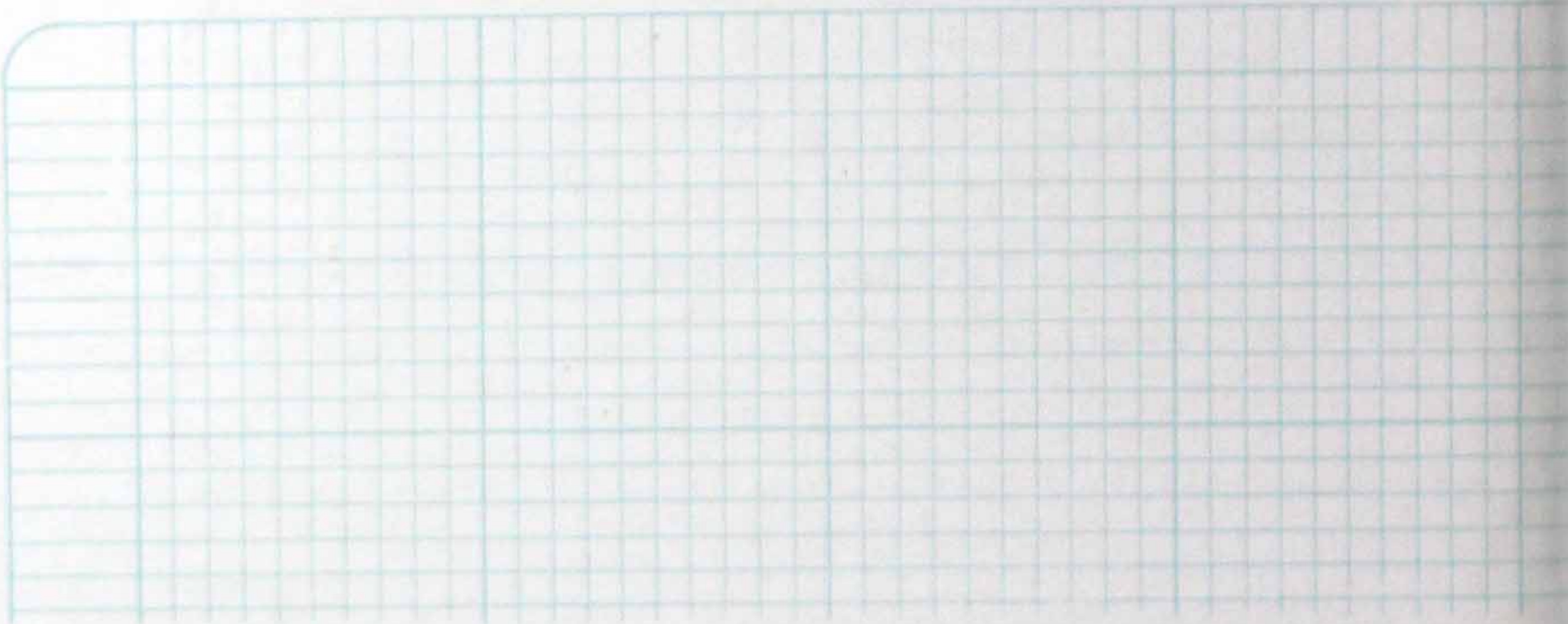
tion tables, naturals, etc.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ ENGINEERS'

SECTION							
STA.	ELEVA.	GRADE	CUT OR FILL				
			LEFT		C	RIGHT	

- No. 774. Earthworks Book, Leather binding, 5x8 in., 80 leaves.....
- No. 774F. Earthworks Book, Fabrikoid binding, 5x8 in., 80 leaves.....



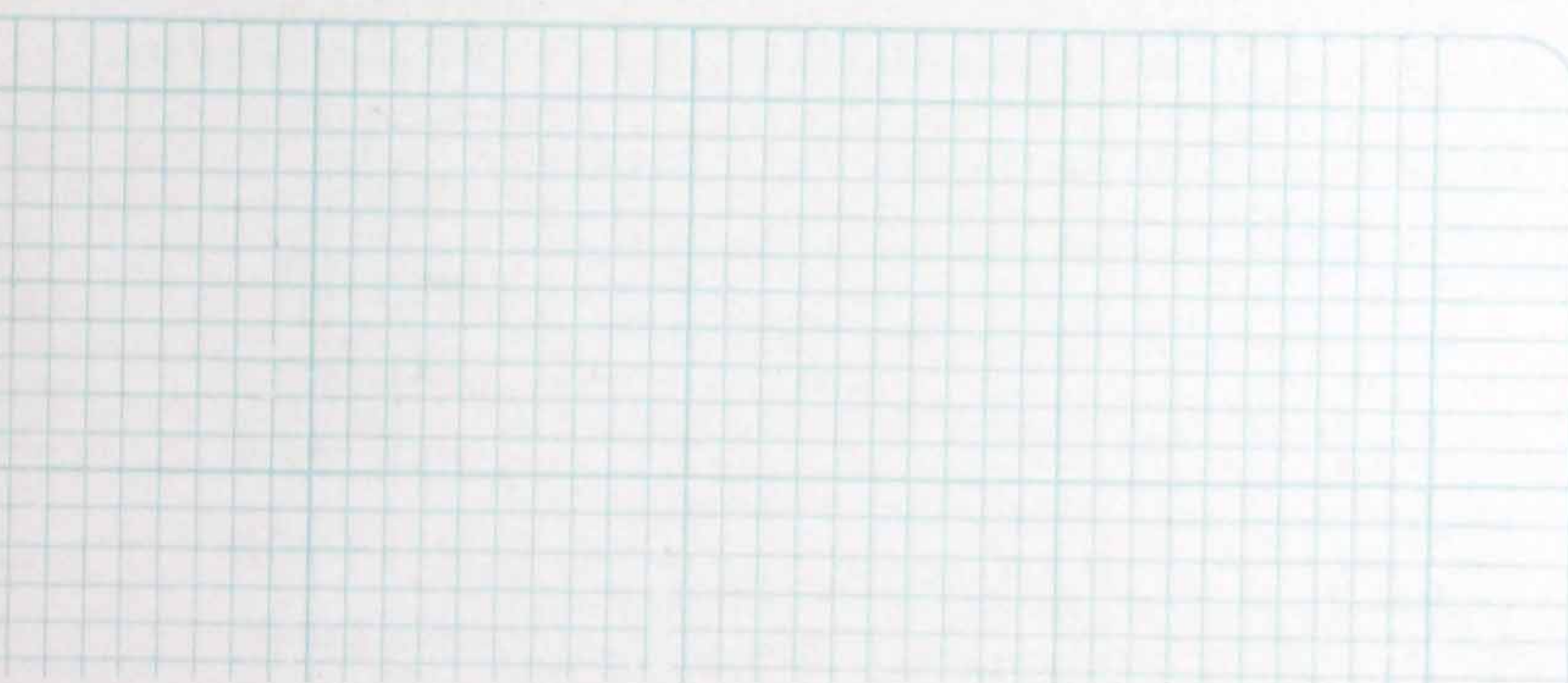
- No. 777. Cross-Section Book, Leather binding, 4½x7¼ in., 80 leaves, 10x10 to the inch.....
- No. 777F. Cross-Section Book, Fabrikoid binding, 4½x7¼ in., 80 leaves, 10x10 to the inch.....
- No. 778. Cross-Section Book, Leather binding, 5½x7½ in., 80 leaves, 10x10 to the inch.....
- No. 778F. Cross-Section Book, Fabrikoid binding, 5½x7½ in., 80 leaves, 10x10 to the inch.....
- No. 779. Cross-Section Book, Leather binding, 6½x8½ in., 80 leaves, 10x10 to the inch.....
- No. 779F. Cross-Section Book, Fabrikoid binding, 6½x8½ in., 80 leaves, 10x10 to the inch.....

SEE PRICE LIST IN BACK OF CATALOG

ELD BOOKS

AREAS		CUBIC YDS.		REMARKS
EXCAVATION	EMBANKMENT	EXCAV.	EMBANK.	

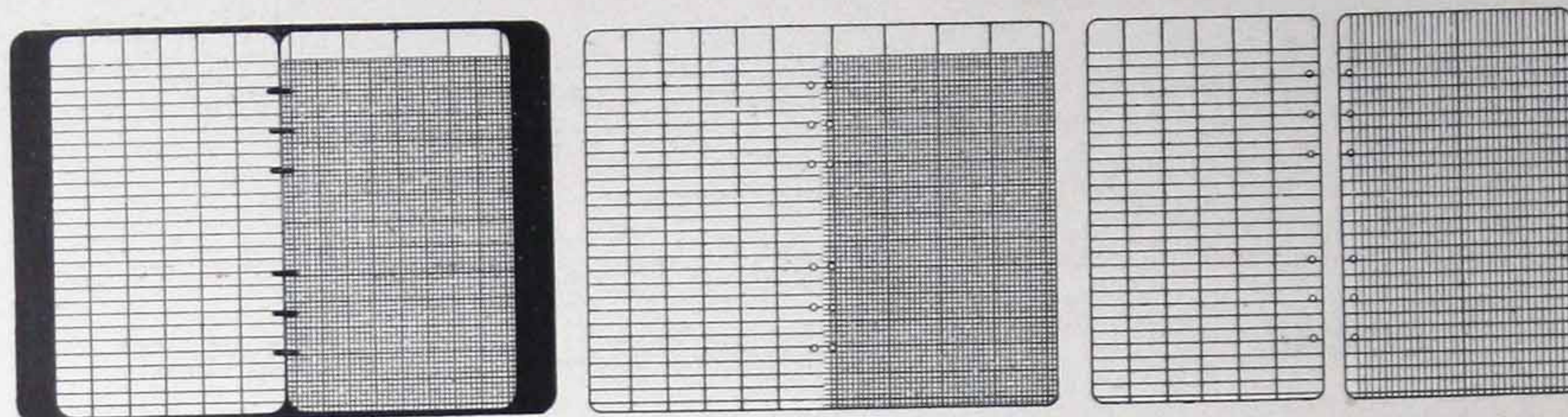
.....	Code Word,	HADDY	Per doz.	Each
.....	"	HADDEFF	Per doz.	Each



.....	Code Word,	HAFER	Per doz.	Each
.....	"	HAFEREFF	Per doz.	Each
.....	"	HAFIN	Per doz.	Each
.....	"	HAFINEFF	Per doz.	Each
.....	"	HAFOL	Per doz.	Each
.....	"	HAFOLEFF	Per doz.	Each

SEE PRICE LIST IN BACK OF CATALOG

LOOSE LEAF ENGINEERS' FIELD BOOKS



Our binders have stiff covers. No. 790 has genuine leather cover and No. 790F is covered with Fabrikoid, a very strong imitation leather. Binder No. 792C has a stiff canvas cover and $\frac{7}{8}$ inch rings. The mechanism in all binders is strong and consists of six metal rings which are readily opened when necessary.

COVERS

		Code Word
No. 790.	Heavy Leather-Covered Binder, $7\frac{1}{4} \times 4\frac{1}{2}$ with $\frac{1}{2}$ -inch rings.....	HAG
No. 790F.	Fabrikoid-Covered Binder, $7\frac{1}{4} \times 4\frac{1}{2}$ with $\frac{1}{2}$ -inch rings.....	HAGAN
No. 792C.	Canvas covered binder, $7\frac{1}{4} \times 4\frac{1}{2}$ with $\frac{7}{8}$ -inch rings...	HAGPIN

LOOSE LEAF SHEETS

Loose leaves can be furnished in two styles, single sheets and double sheets. Single sheets are ruled on both sides and are used consecutively. Double sheets are ruled on one side only and the left and right hand pages of each record are joined.

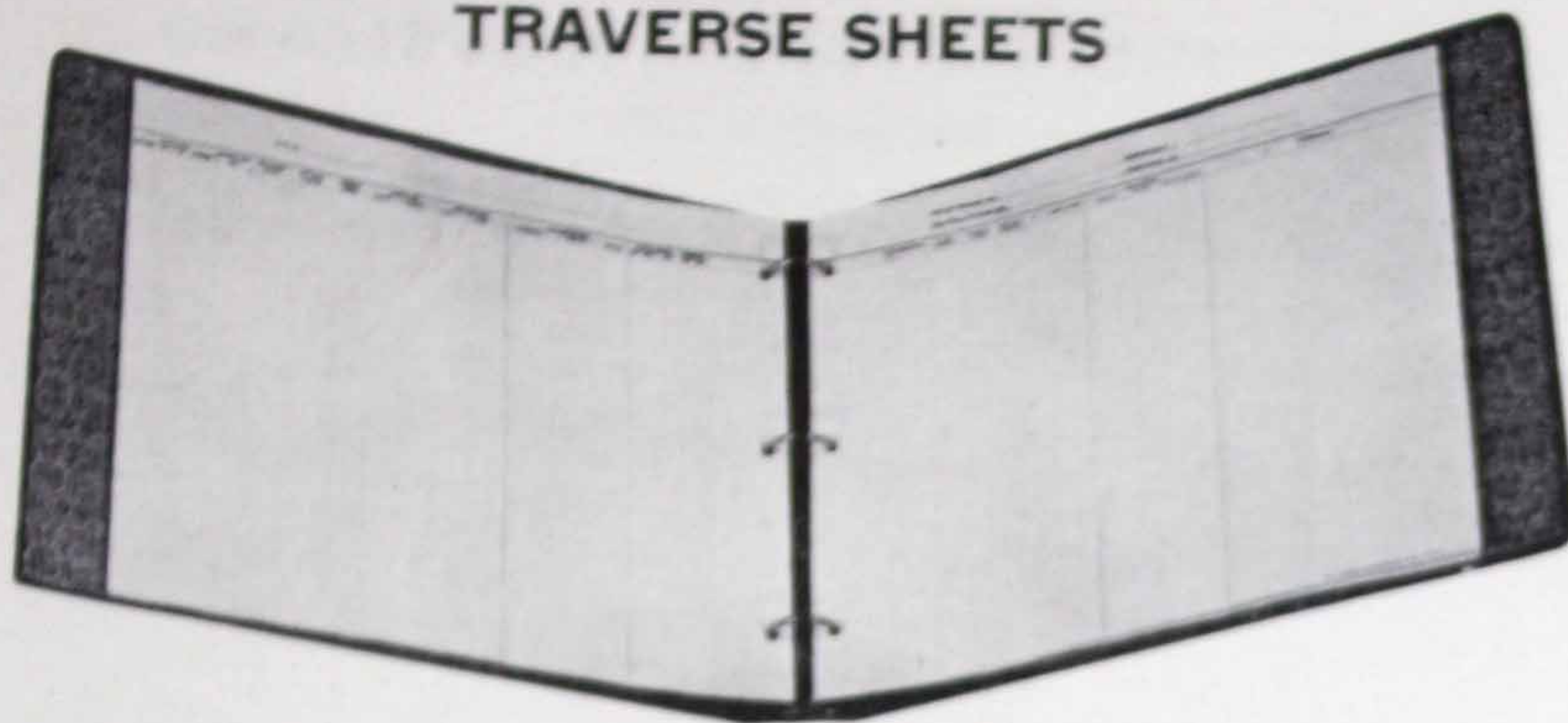
		Code Word
No. 0760.	Single Loose Leaf Sheets like Field Book No. 760. Per 100.....	HAIL
No. 0760D.	Double Loose Leaf Sheets like Field Book No. 760. Per 100.....	HAILING
No. 0763.	Single Loose Leaf Sheets like Field Book No. 763. Per 100.....	HAILOR
No. 0763D.	Double Loose Leaf Sheets like Field Book No. 763. Per 100.....	HAILSTER
No. 0764.	Single Loose Leaf Sheets like Field Book No. 764. Per 100.....	HALATION
No. 0764D.	Double Loose Leaf Sheets like Field Book No. 764. Per 100.....	HALBERD
No. 0772.	Single Loose Leaf Sheets like Level Book No. 772. Per 100.....	HALCYON
No. 0772D.	Double Loose Leaf Sheets like Level Book No. 772. Per 100.....	HALO
No. 0777.	Single Loose Leaf Sheets like Field Book No. 777. Per 100.....	HALOID
No. 0777D.	Double Loose Leaf Sheets like Field Book No. 777. Per 100.....	HALTER

GUMMED REINFORCEMENTS

No. 798.	Gummed Muslin Eyelets, for reinforcing holes of loose leaf sheets. Per 100.....	HALYARD
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SEE PRICE LIST IN BACK OF CATALOG

TRAVERSE SHEETS



- | | | | |
|----------|---|---------|------|
| No. 807. | Tabling or Traverse Sheets, 9½x12 inches—20 vertical columns, with printed headings punched to fit binder | Per 100 | Doz. |
| No. 809. | Tabling or Traverse Sheets, 11x16 inches—14 vertical columns, with printed headings. | HAMANY | |
| No. 808. | Loose Leaf Binder, stiff canvas cover, 12½x10 inches with three rings, capacity about 250 Traverse Sheets | HAMATI | |
| No. 807. | | HAMAYRE | |

ENGINEERS' FIELD BAGS



No. 814



No. 815

- | | | |
|----------|--|-----------|
| No. 814. | Leather Carrying Bag for Surveyors, 10x14x2½, with two compartments. | Code Word |
| No. 815. | Leather Carrying Bag for Surveyors, 9x11x2½, with two compartments. | HAMFEST |
| No. 816. | Canvas Carrying Bag for Surveyors, 9x7x2½, with two compartments. | HAMLET |
| | | HAMPER |

STRAPS FOR CARRYING STAKES

- | | | |
|----------|--|---------|
| No. 820. | Webb Carrying Straps for carrying stakes, with buckle. | HAMSTER |
|----------|--|---------|

SEE PRICE LIST IN BACK OF CATALOG

LIETZ PROFILE PAPERS AND CLOTHS
Continuous in Rolls

Our Profile Papers and Cloths are printed on the best grade of material. Will stand erasing well and they are superior in accuracy and clearness of lines.

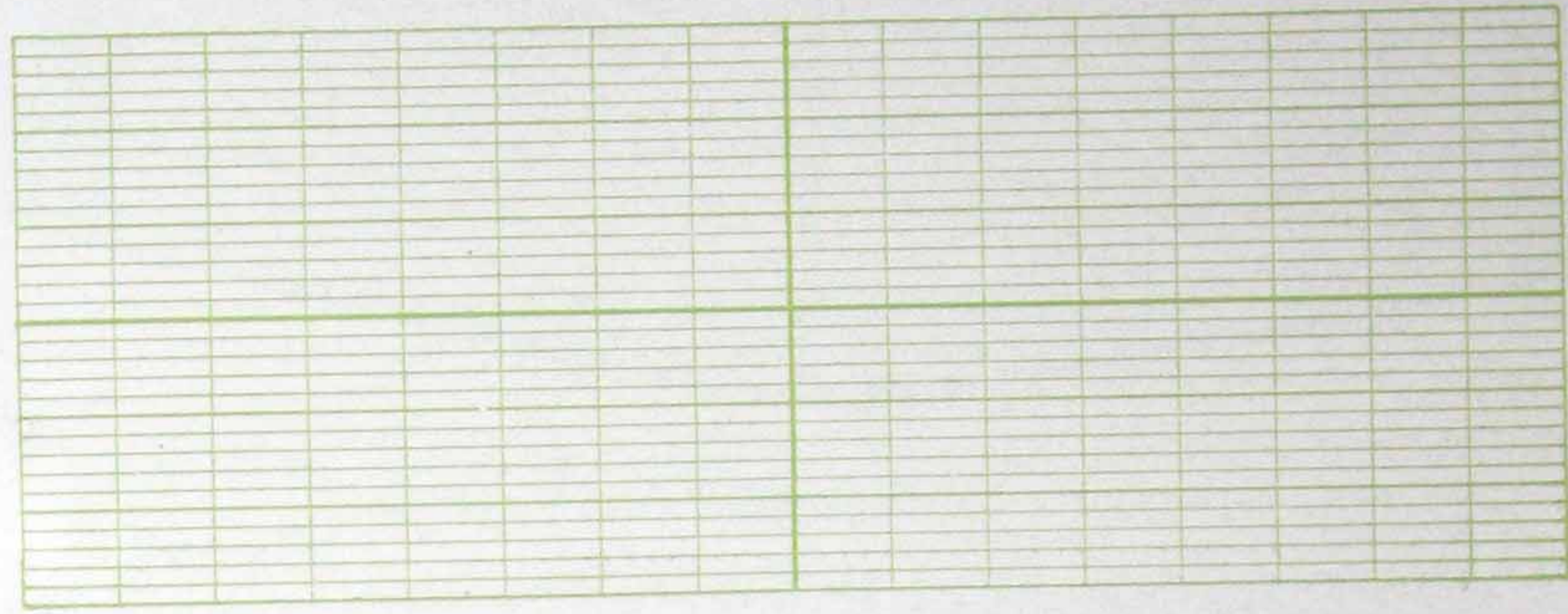


Plate A, 4x20 to One Inch.

		Code Word
		Per Roll Per Yd.
No. 840G.	Green, 20 in. wide, Drawing Paper, 50-yd. rolls..	HANDLE
No. 840O.	Orange, 20 in. wide, Drawing Paper, 50-yd. rolls..	HANDLING
No. 840½G.	Green, 10 in. wide, Drawing Paper, 50-yd. rolls..	HANDBILL
No. 840½O.	Orange, 10 in. wide, Drawing Paper, 50-yd. rolls..	HANDCUFF
No. 841G.	Green, 20 in. wide, Mounted on Muslin, 20-yd. rolls.....	
No. 841O.	Orange, 20 in. wide, Mounted on Muslin, 20-yd. rolls.....	
No. 842O.	Orange, 20 in. wide, Tracing Paper, 50-yd. rolls..	HANDFULL
No. 842½O.	Orange, 10 in. wide, Tracing Paper, 50-yd. rolls..	HANDGET
No. 843G.	Green, 20 in. wide, Drawing Cloth, 20-yd. rolls..	
No. 844G.	Green, 20 in. wide, Tracing Cloth, 20-yd. rolls...	HANDOUT
No. 844O.	Orange, 20 in. wide, Tracing Cloth, 20-yd. rolls..	HANDSEL
No. 844½O.	Orange, 10 in. wide, Tracing Cloth, 20-yd. rolls..	HANDSOME

PROFILE-PLAN PAPERS AND CLOTHS
Plate A, 4x20 to One Inch.

Width of paper same as our 20-inch papers, but ruling only 10 inches wide, leaving the other half blank for sketching and for explanatory notes. A very convenient paper as it saves referring to several maps for the desired information.

		Code Word
		Per Roll Per Yd.
No. 846G.	Green, Drawing Paper, 50-yard rolls.....	HANGAR
No. 846O.	Orange, Drawing Paper, 50-yard rolls.....	HANGDOG
No. 847O.	Orange, Tracing Paper, 50-yard rolls.....	HANGFORT
No. 848G.	Green, Tracing Cloth, 20-yard rolls.....	HANGMAN
No. 848O.	Orange, Tracing Cloth, 20-yard rolls.....	HANGTOWN

Samples of any of our Papers sent on application.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ PROFILE PAPERS AND CLOTHS

Continuous in Rolls

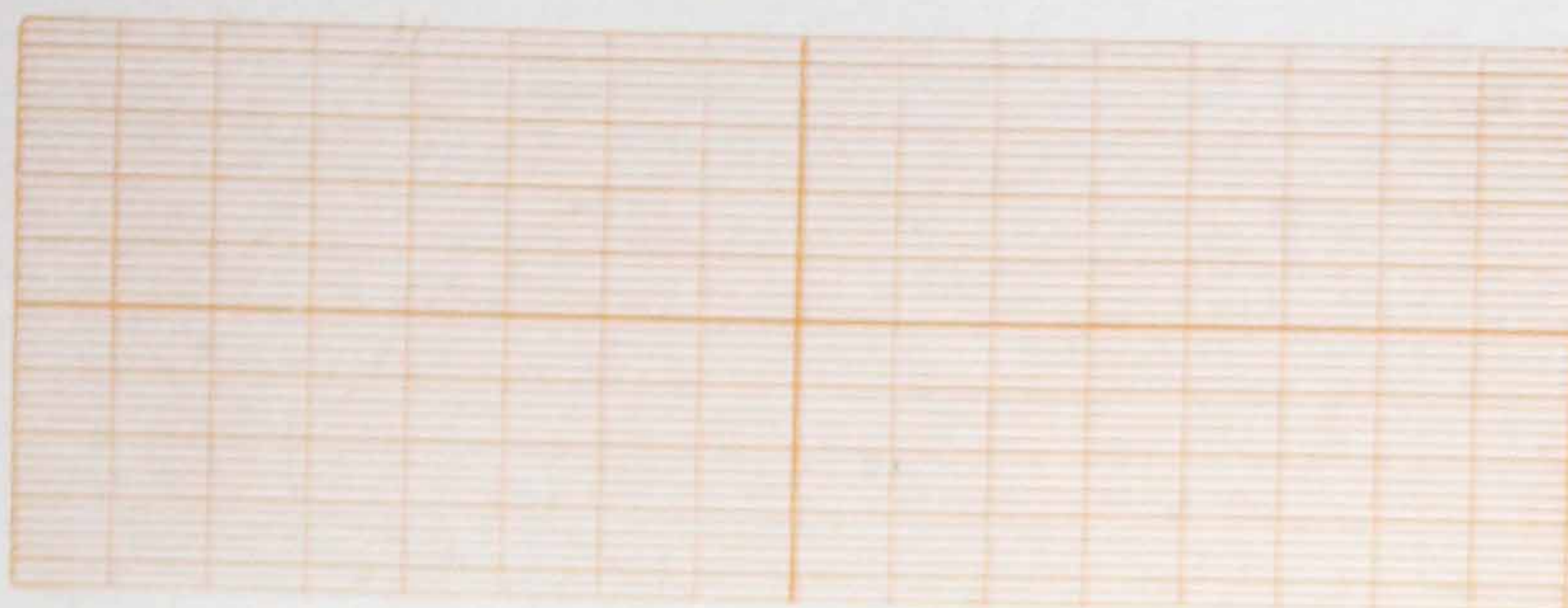


Plate B, 4x30 to One Inch.

		Code Word	
		Per Roll	Per Yd.
No. 850G.	Green, 20 in. wide, Drawing Paper, 50-yd. rolls.	HAPLY	
No. 850O.	Orange, 20 in. wide, Drawing Paper, 50-yd. rolls.	HAPLESS	
No. 850½G.	Green, 9 in. wide, Drawing Paper, 50-yd. rolls.	HAPPER	
No. 850½O.	Orange, 9 in. wide, Drawing Paper, 50-yd. rolls.	HAPPY	
No. 851G.	Green, 20 in. wide, mounted on Muslin, 20-yd. rolls.		
No. 851O.	Orange, 20 in. wide, mounted on Muslin, 20-yd. rolls.		
No. 852O.	Orange, 20 in. wide, Tracing Paper, 50-yd. rolls.	HAPLOMA	
No. 852½O.	Orange, 9 in. wide, Tracing Paper, 50-yd. rolls.		
No. 853G.	Green, 20 in. wide, Drawing Cloth, 20-yd. rolls.		
No. 854G.	Green, 20 in. wide, Tracing Cloth, 20-yd. rolls.	HAPTIC	
No. 854O.	Orange, 20 in. wide, Tracing Cloth, 20-yd. rolls.	HAPWIN	
No. 854½O.	Orange, 10 in. wide, Tracing Cloth, 20-yd. rolls.	HAPWISE	

PROFILE-PLAN PAPERS AND CLOTHS

Plate B, 4x30 to One Inch.

20-inch stock, but ruled only 9 inches, leaving other half blank for sketching, etc.

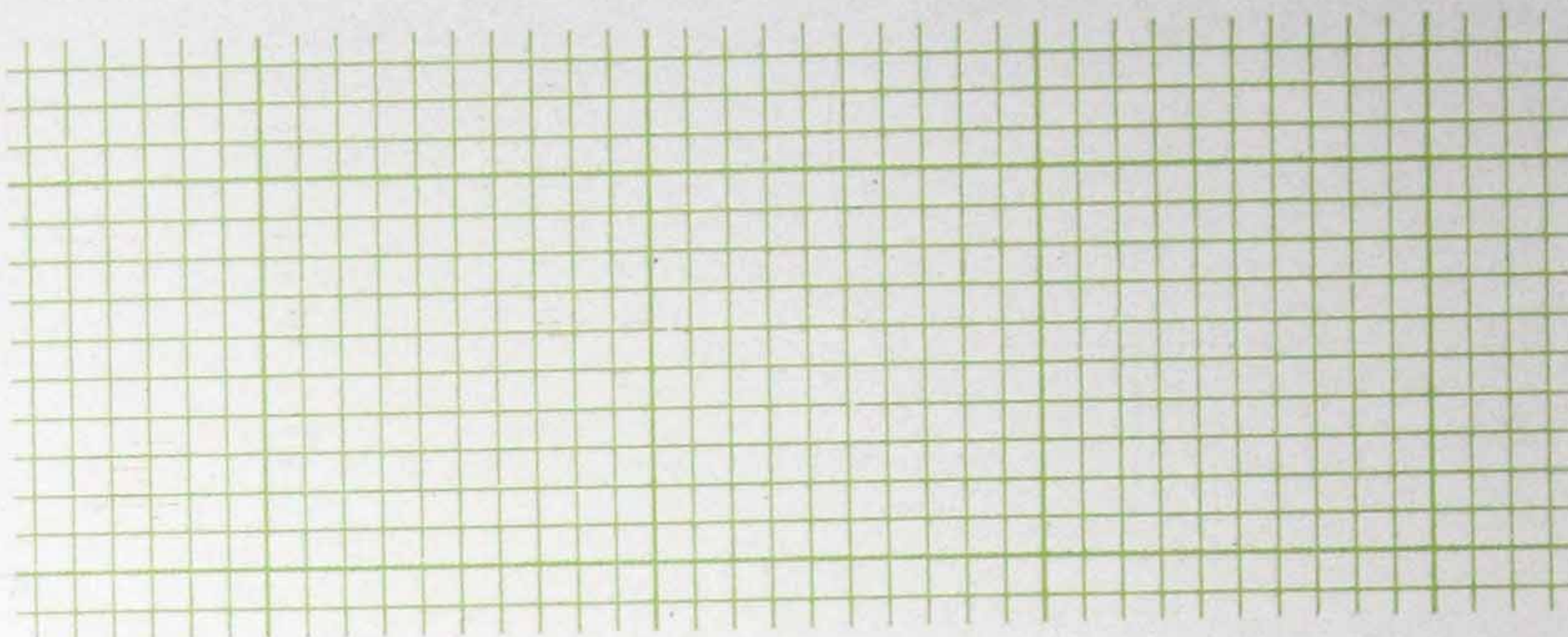
		Code Word	
		Per Roll	Per Yd.
No. 856G.	Green, Drawing Paper, 50-yd. rolls.	HARAN	
No. 856O.	Orange, Drawing Paper, 50-yd. rolls.	HARBOR	
No. 857O.	Orange, Tracing Paper, 50-yd. rolls.	HARDY	
No. 858G.	Green, Tracing Cloth, 20-yd. rolls.	HARE	
No. 858O.	Orange, Tracing Cloth, 20-yd. rolls.	HAREBELL	

Samples of any of our papers sent on application.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ CROSS SECTION PAPERS AND CLOTHS

Continuous in Rolls



10x10 to 1 Inch.

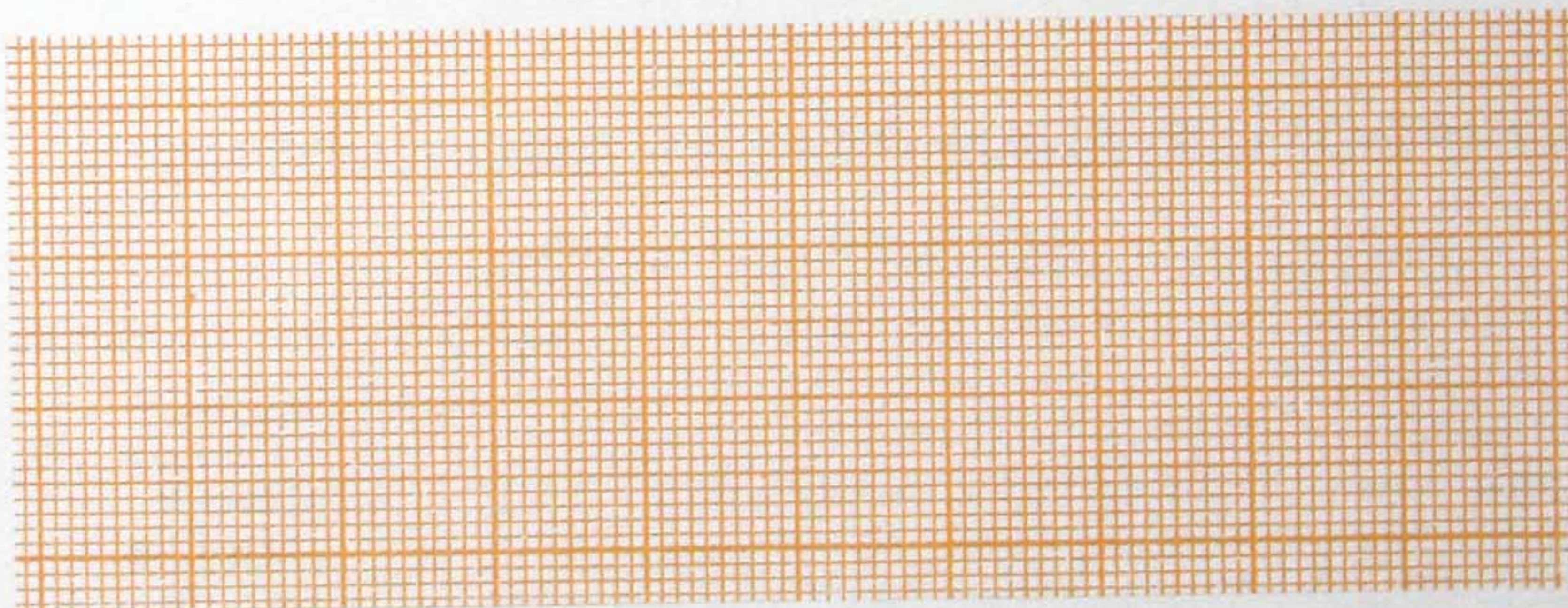
		Code Word	Per Roll	Per Yd.
No. 860 G.	Green, 20 in. wide, Drawing Paper, 50-yd. rolls.....	HAREFOOT		
No. 860 O.	Orange, 20 in. wide, Drawing Paper, 50-yd. rolls.....	HARELIP		
No. 861 G.	Green, 20 in. wide, Mounted on Muslin, 20-yd. rolls.....			
No. 861 O.	Orange, 20 in. wide, Mounted on Muslin, 20-yd. rolls.....			
No. 862 O.	Orange, 20 in. wide, Tracing Paper, 50-yd. rolls.....	HAREM		
No. 863 G.	Green, 20 in. wide, Drawing Cloth, 20-yd. rolls.....			
No. 864 G.	Green, 20 in. wide, Tracing Cloth, 20-yd. rolls.....	HARICOT		
No. 864 O.	Orange, 20 in. wide, Tracing Cloth, 20-yd. rolls.....	HARIOTT		

8x8 to 1 Inch.

		Code Word	Per Roll	Per Yd.
No. 865 G.	Green 20 in. wide, Drawing Paper, 50-yd. rolls.....	HARK		
No. 865 O.	Orange 20 in. wide, Drawing Paper, 50-yd. rolls.....	HARKER		
No. 867 O.	Orange 20 in. wide, Tracing Paper, 50-yd. rolls.....	HARKING		

LIETZ MILLIMETER PAPERS AND CLOTHS

Continuous in Rolls



		Code Word	Per Roll	Per Yd.
No. 870 O.	Orange, 50 cm. wide, Drawing Paper, 50-yd. rolls.....	HARMEL		
No. 871 O.	Orange, 50 cm. wide, Mounted on Muslin, 20-yd. rolls.....	HARMON		
No. 872 O.	Orange, 50 cm. wide, Tracing Paper, 50-yd. rolls.....	HARNESS		
No. 874 O.	Orange, 50 cm. wide, Tracing Cloth, 20-yd. rolls.....	HARPOON		

SEE PRICE LIST IN BACK OF CATALOG

LIETZ ENGRAVED CROSS SECTION PAPERS IN SHEETS

Size of engraving 16x20 inches. Size of sheet 18x23 inches.

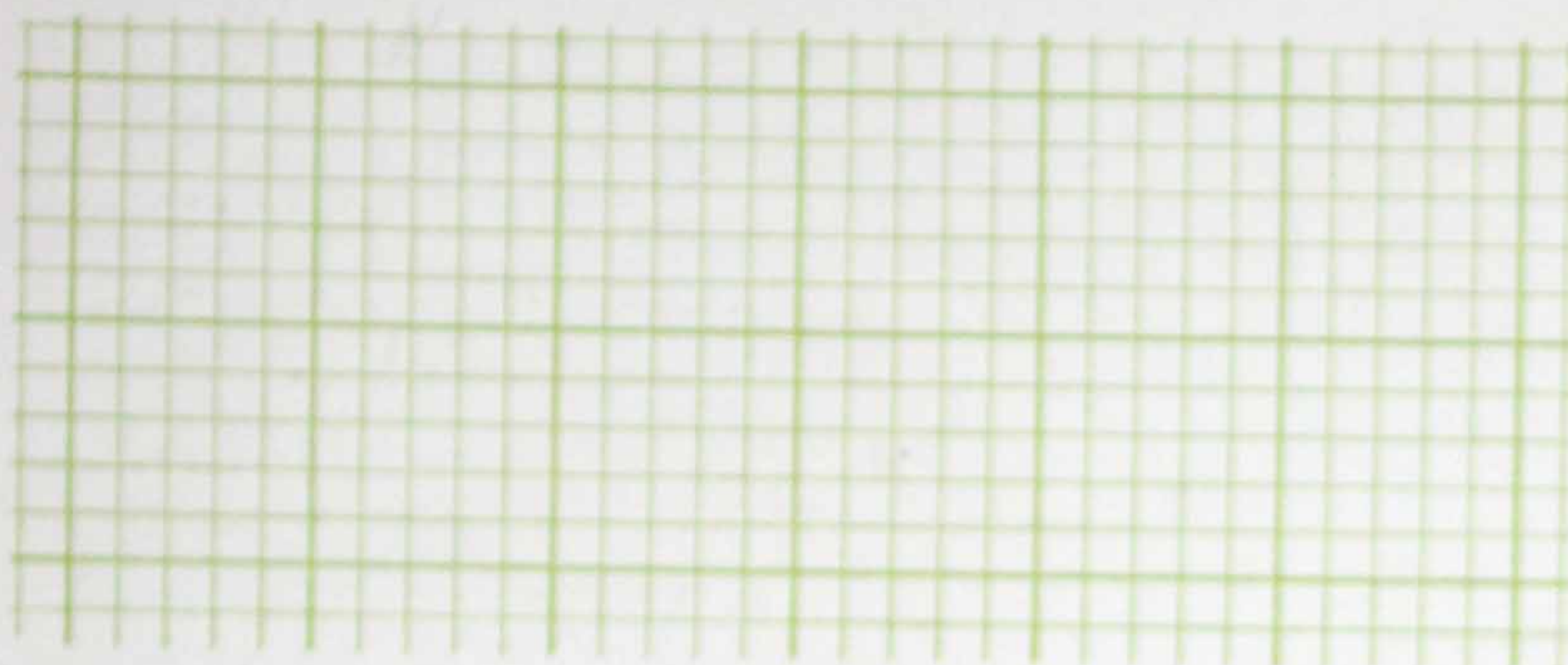
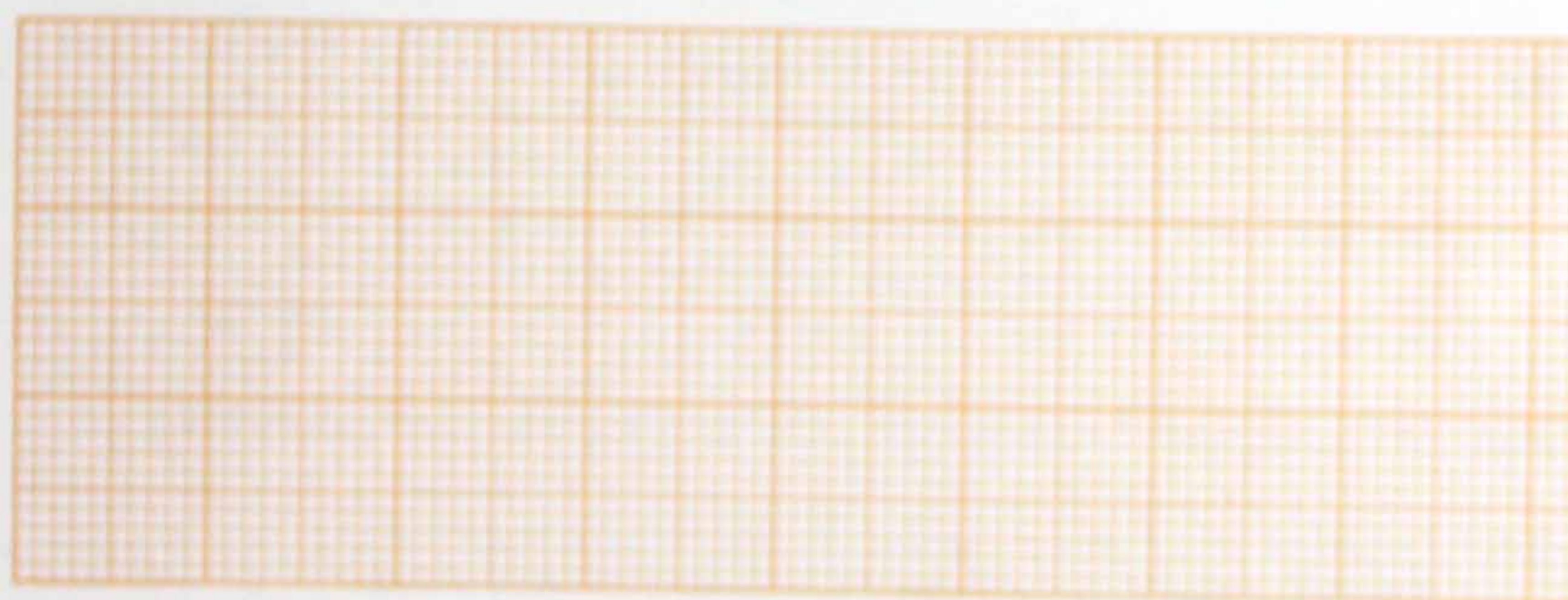


Illustration of engraving 8x8 to one inch.

No.	Description	Code Word	Quire Sheet
No. 880 G.	Green, engraving 8x8 to one inch, on Drawing Paper	HASLET	
No. 880 O.	Orange, engraving 8x8 to one inch, on Drawing Paper	HASP	
No. 881 O.	Orange, engraving 8x8 to one inch, on Tracing Paper	HASSOCK	
No. 882 G.	Green, engraving 10x10 to one inch, on Drawing Paper	HASTE	
No. 882 O.	Orange, engraving 10x10 to one inch, on Drawing Paper	HASTY	
No. 883 O.	Orange, engraving 10x10 to one inch, on Tracing Paper	HATBAND	
No. 884 G.	Green, engraving 12x12 to one inch, on Drawing Paper	HATBOX	
No. 885 G.	Green, engraving 16x16 to one inch, on Drawing Paper	HATRACK	
No. 885 O.	Orange, engraving 16x16 to one inch, on Drawing Paper	HATCH	
No. 886 O.	Orange, engraving 16x16 to one inch, on Tracing Paper	HATCHERY	

For ruled Cross Section Papers in Sheets see page 179.



10x10 to the half inch, fifth lines heavy.

No.	Description	Code Word	Per 100 Sheets Quire
No. 890 A.	Olive tint, engraving 5 x 7½, on Drawing Paper	HATCHET	
No. 891 O.	Orange, engraving 5 x 7½, on Tracing Paper	HATCHLING	
No. 892 A.	Olive tint, engraving 7½x10, on Drawing Paper	HATCHMENT	
No. 893 O.	Orange, engraving 7½x10, on Tracing Paper	HATCHWAY	
No. 894 A.	Olive tint, engraving 10 x15, on Drawing Paper	HATER	
No. 895 O.	Orange, engraving 10 x15, on Tracing Paper	HATY	

ENGRAVED MILLIMETER PAPERS IN SHEETS

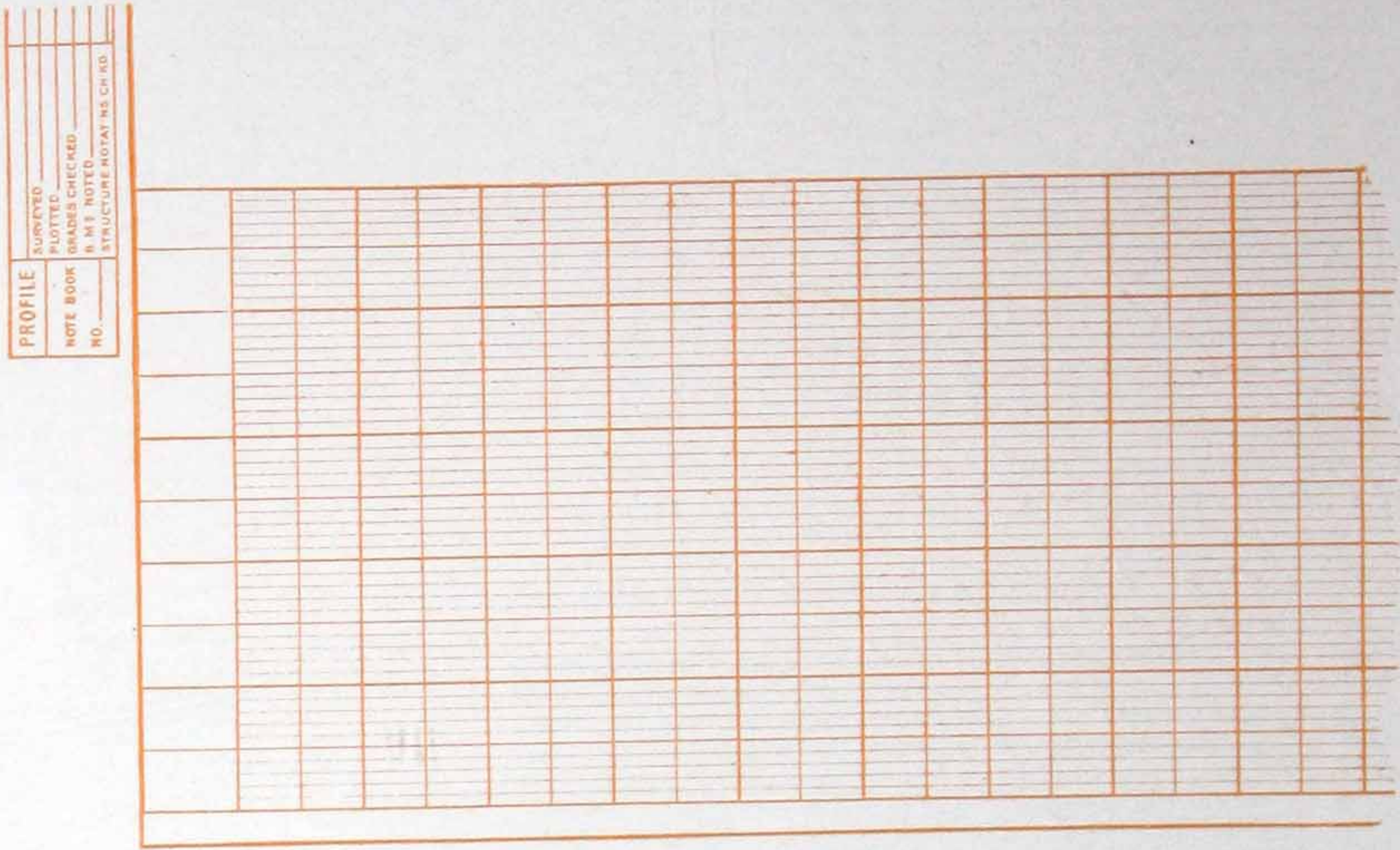
Divided in millimeters, centimeter lines heavy.

No.	Description	Code Word	Per 100 Sheets Quire
No. 900 A.	Olive tint, engraving 18x22 cm., on Drawing Paper	HAUBERK	
No. 901 O.	Orange, engraving 18x22 cm., on Tracing Paper	HAULAGE	
No. 902 O.	Orange, engraving 18x25 cm., on Drawing Paper	HAULER	
No. 903 O.	Orange, engraving 18x25 cm., on Tracing Paper	HAULM	

SEE PRICE LIST IN BACK OF CATALOG

FEDERAL AID SHEETS

As recommended by the U. S. Department of Agriculture, Office of Public Roads and Rural Engineering.



No. 905

Code Word

No. 904. Plan Profile Sheet, orange, **Tracing Paper**, size of sheet 23×36 in., size of border line 22×33½ in., size of profile 10×33½ in. Profile ruled lengthwise to the half inch, in height to one-tenth of an inch. Two titles for profile and plan on left-hand side of sheet, outside of border line.....**HAUM**

No. 904C. Plan Profile Sheet, like No. 904, but **Tracing Cloth**..**HAUMER**

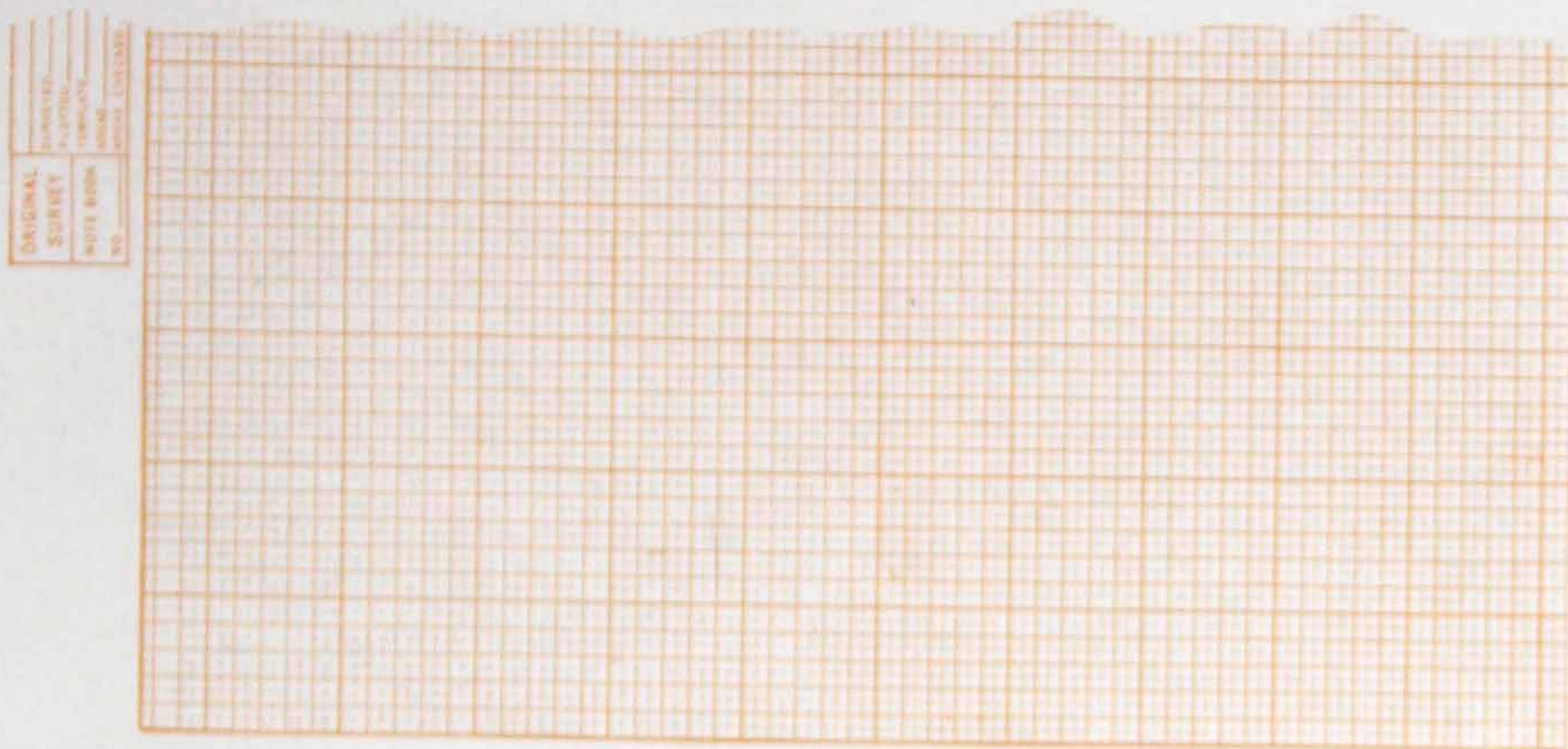
No. 905. Double Plan Profile Sheet, for flat profiles, orange, **Tracing Paper**, size of sheet, border line and titles like No. 904. Profile beginning at the bottom of the sheet has the same ruling as sheet No. 904 on the first quarter of the sheet; size of profile 5×32 in.; the second quarter is blank, the third quarter bears a profile like the first quarter, and the fourth quarter is blank.....**HAUNT**

No. 905C. Double Plan Profile Sheet like No. 905 but **Tracing Cloth**.....**HAUNTER**

SEE PRICE LIST IN BACK OF CATALOG

FEDERAL AID SHEETS

As recommended by the U. S. Department of Agriculture, Office of Public Roads and Rural Engineering.



No. 906

Code Word

No. 906. Cross Section Sheet, orange, **Tracing Paper**, size of sheet 23×36 in., size of border line $22 \times 33\frac{1}{2}$ in., size of profile $21 \times 33\frac{1}{2}$ in. Engraving 10×10 to the inch, every tenth line heavy. Two titles for Original Survey and Final Survey on left-hand side of sheet, outside of border line. **HAUTBOY**

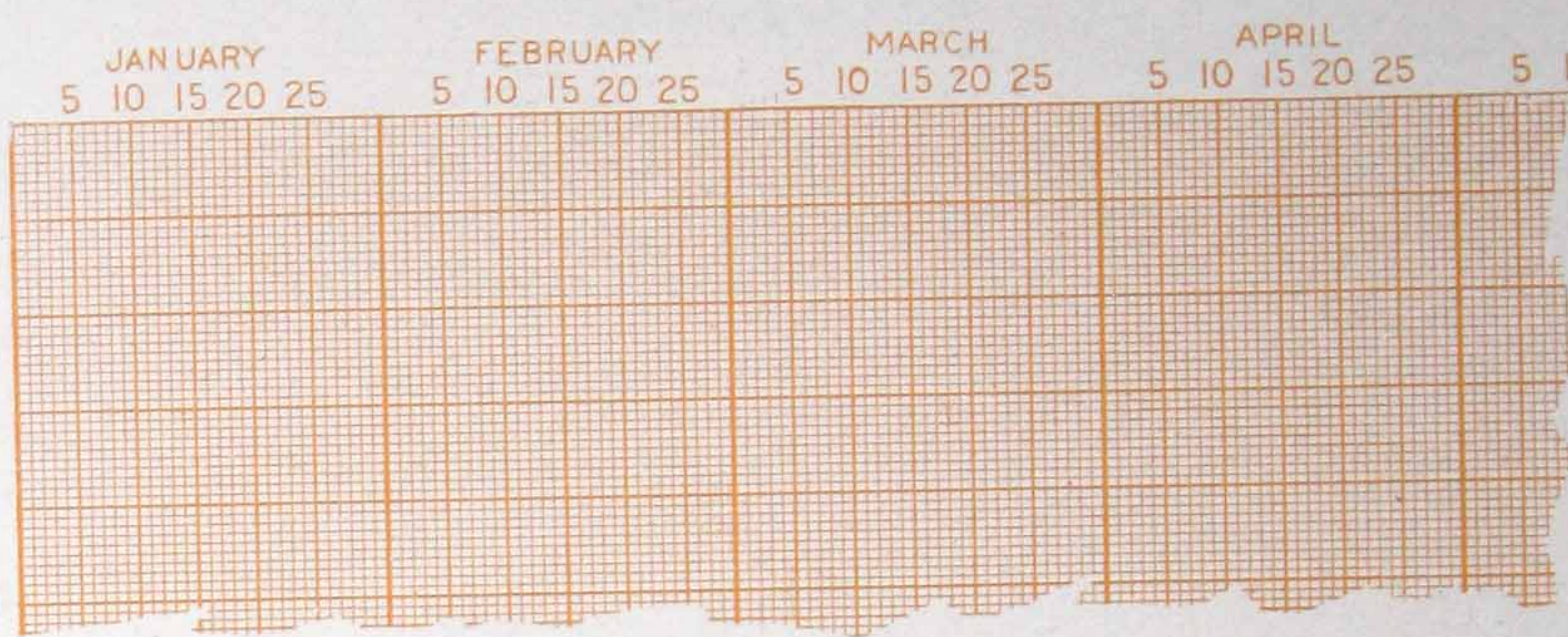
No. 906C. Cross Section Sheet like No. 906 but **Tracing Cloth**. . **HAUTEUR**

No. 907. Plan Cross Section Sheet, orange, **Tracing Paper**, size of sheet, border line and titles like No. 906. Cross section ruling beginning at the bottom of the sheet is the same as on 906. It fills half of the sheet, size of profile $10 \times 33\frac{1}{2}$ in., the second half being blank. . **HAVANA**

No. 907C. Plan Cross Section Sheet, like No. 907 but **Tracing Cloth**. **HAVECK**

SEE PRICE LIST IN BACK OF CATALOG

ENGRAVED RECORD SHEETS



- Per 100

Quire

Sheet

Code Word
- No. 908.

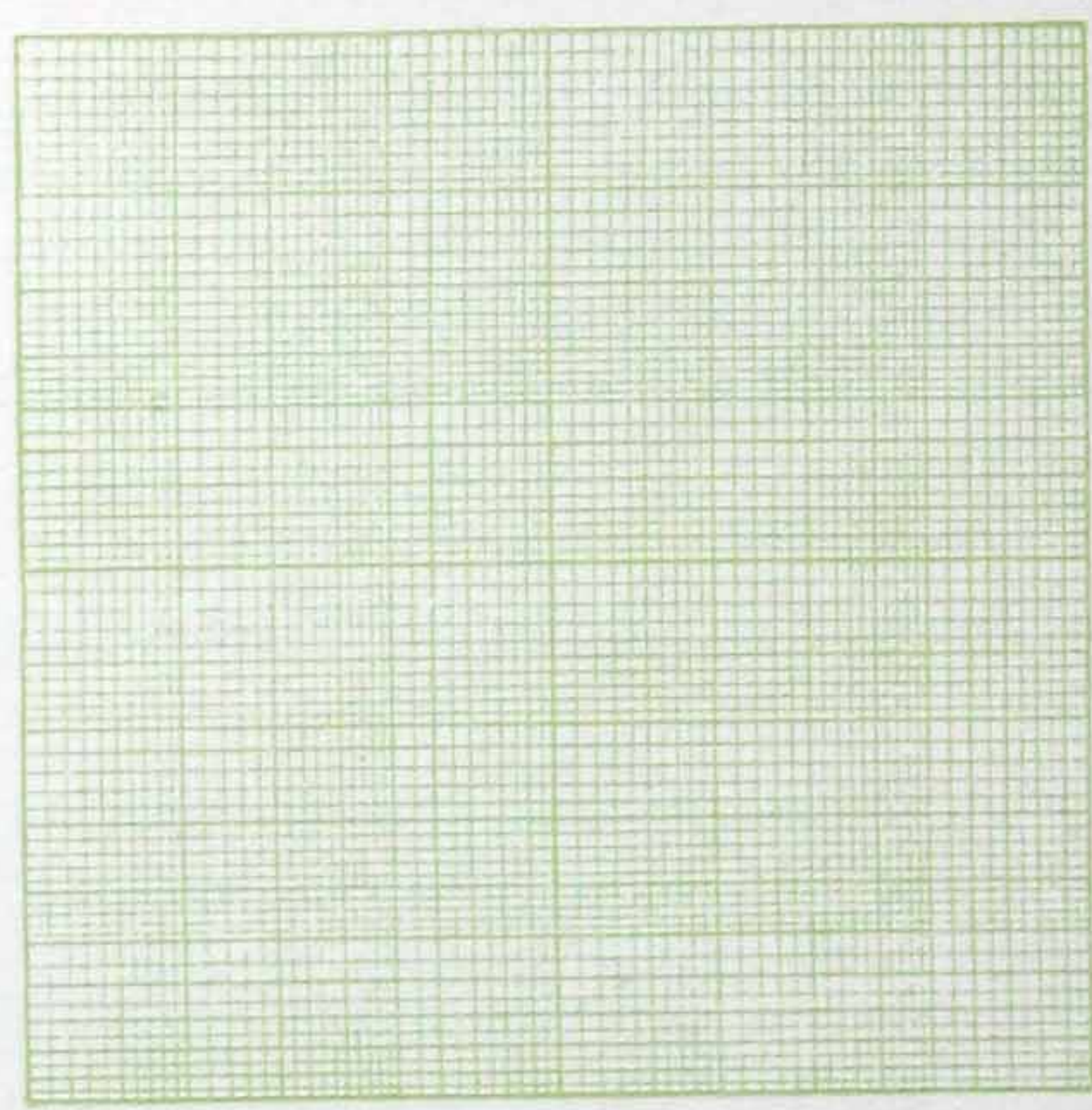
Year by Days Record Paper, 9½x18 inches, on drawing paper; green.....

HAVEN
- No. 909.

Year by Days Record Paper, 9½x18 inches, on tracing paper; orange.....

HAVERT
- For other Record Sheets see Nos. 912 to 914 on page 175.

LOGARITHMIC PAPER



- Per 100

Sheet

Code Word
- No. 925.

Engraving 10x10 inches, on Tracing Bond Paper, green only, 5-inch base.....

HEADLINE
- No. 926.

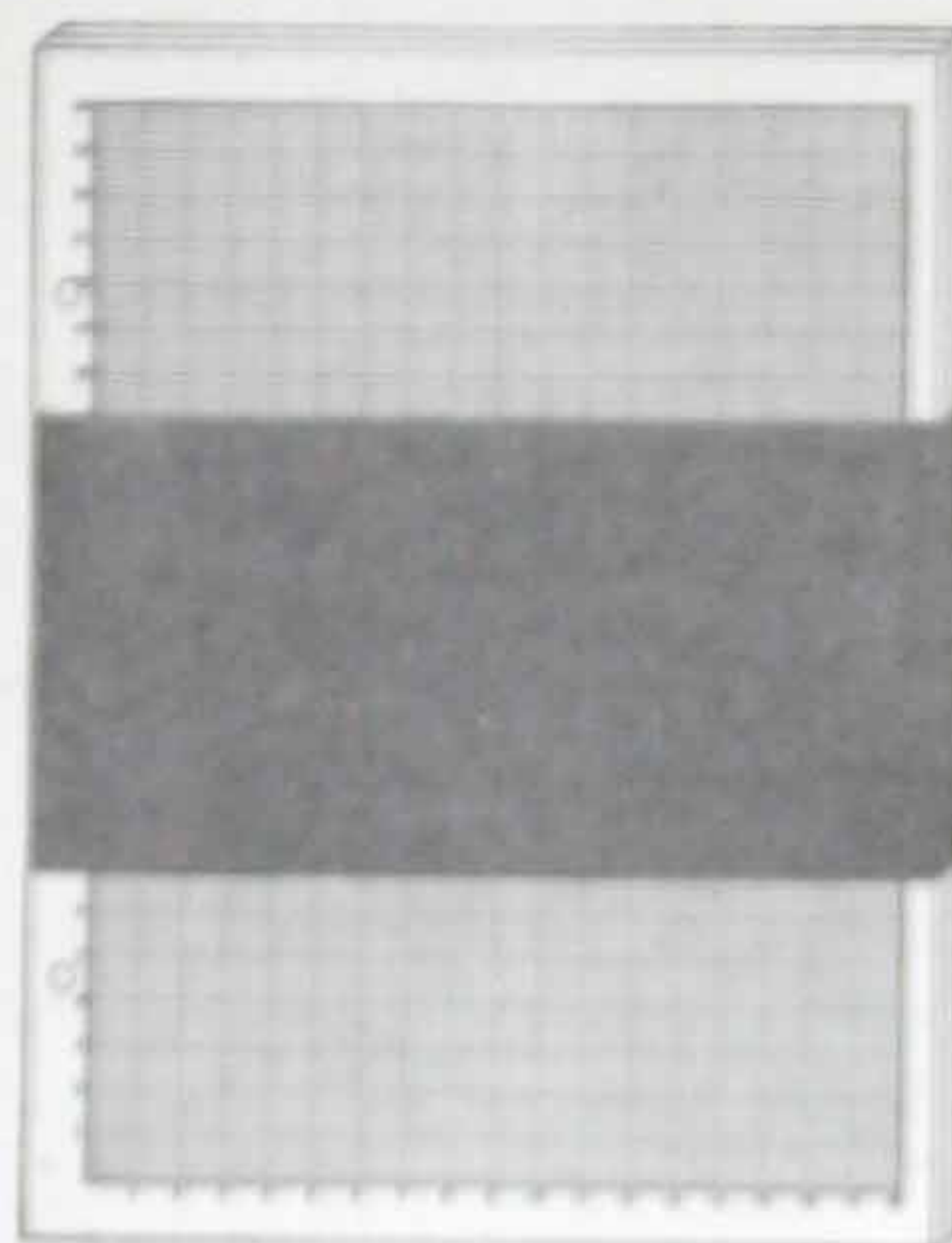
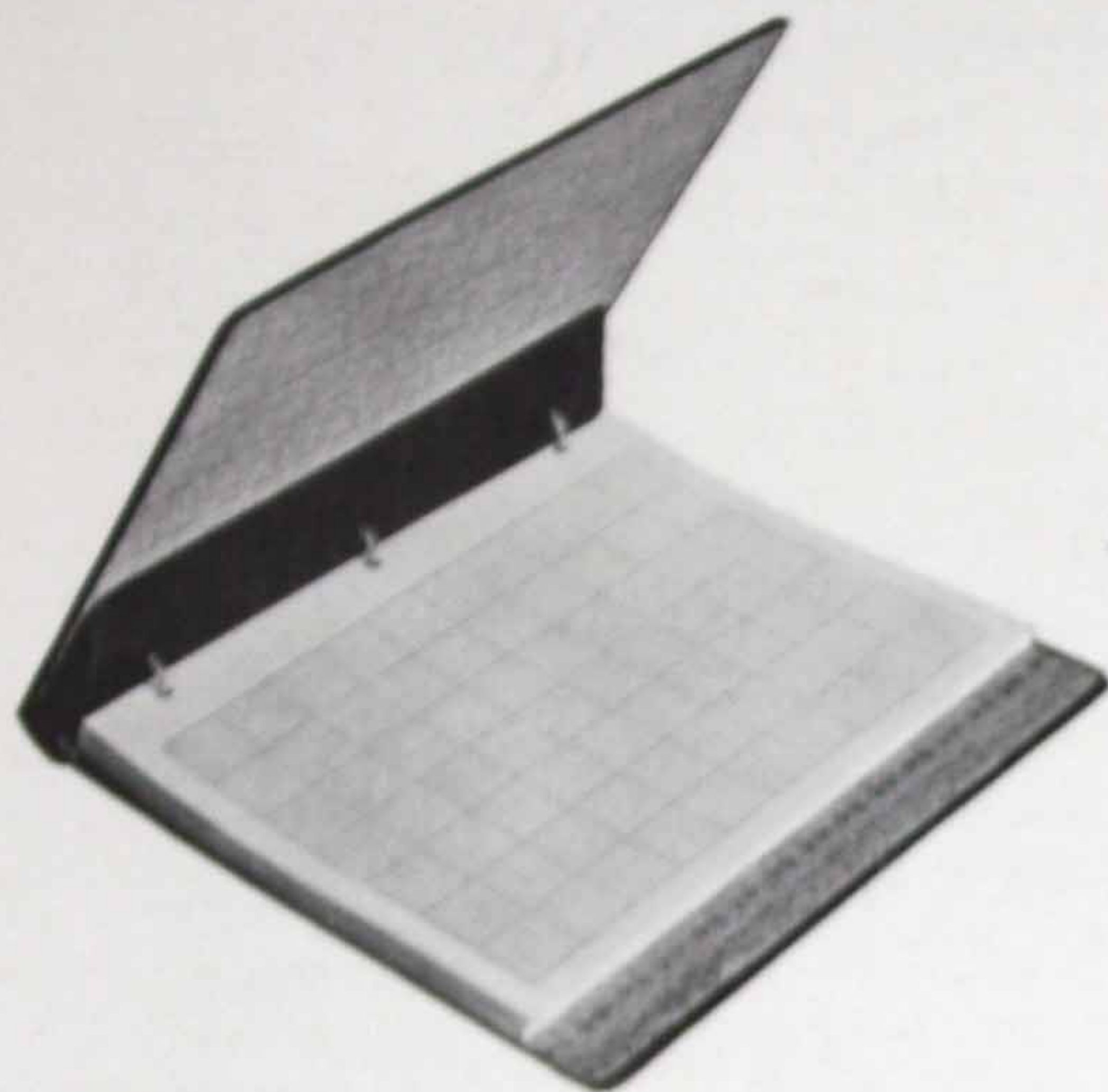
Engraving 10x10 inches, on Tracing Bond Paper, green only, 10-inch base.....

HEADLONG
- For other Logarithmic Papers see Nos. 927A to 927D on page 177.

SEE PRICE LIST IN BACK OF CATALOG

LOOSE LEAF BINDER

FOR LIETZ ENGRAVED DATA PAPER



No. 349A. Loose Leaf Binder, stiff cover, black morocco finish, $11\frac{1}{2} \times 9\frac{1}{2}$ inches with three rings, capacity about 400 sheets Engraved Data Paper. Binder only without filler paper.....Code Word, **FIZZLE**

LIETZ ENGRAVED DATA PAPER

Standardized Sheets of many different divisions suitable for graphic charts, records and statistics. Printed in Green on semi-transparent ledger paper. THESE SHEETS ARE CARRIED IN STOCK UNPUNCHED BUT CAN BE FURNISHED WITH PERFORATIONS TO FIT OUR LOOSE LEAF BINDER No. 349A.

When ordering please state if sheets are to be punched to fit binder.

SHEETS DIVIDED INTO PERIODS OF TIME

	Size of sheet	Kind of engraving	Per 100 Code Word	Per Sheet
No. 912.	$8\frac{1}{2} \times 11$ inches	One Month by Days.....	HAWKER	
No. 912A.	$11 \times 16\frac{1}{2}$ inches	One Fiscal Year by Days.....	HAWLOCK	
No. 913.	$8\frac{1}{2} \times 11$ inches	Five Years by Months.....	HAWSE	
No. 914.	$11 \times 16\frac{1}{2}$ inches	Ten Years by Months.....	HAYMOW	

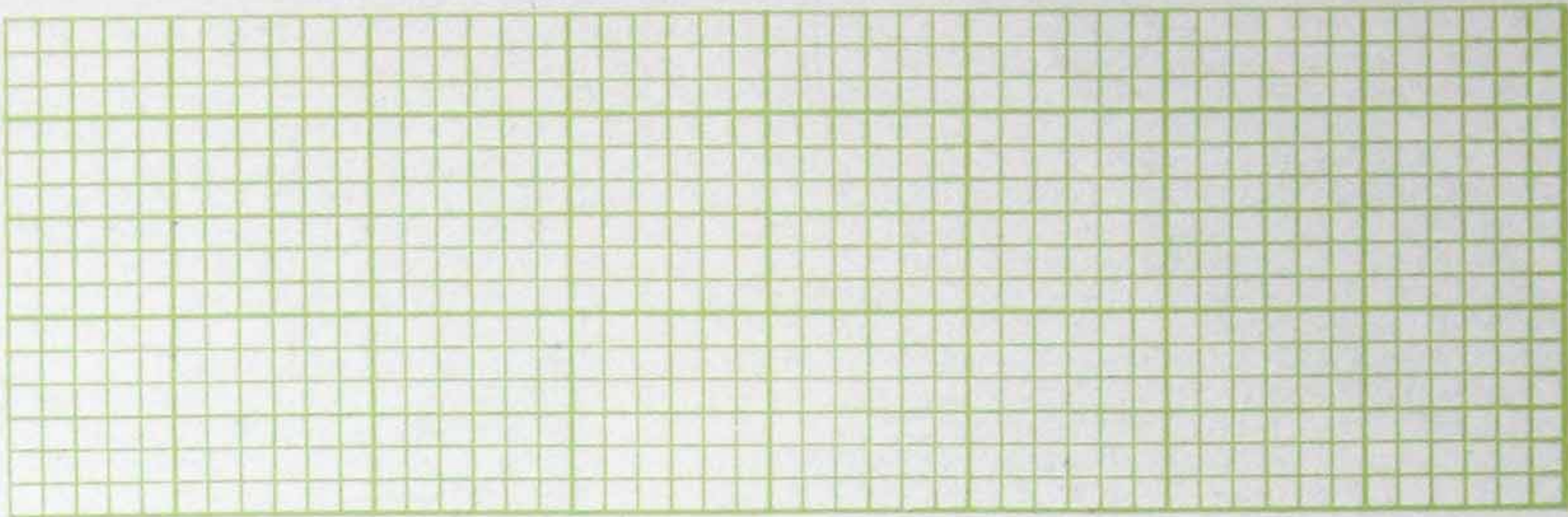
SEE PRICE LIST IN BACK OF CATALOG

LIETZ ENGRAVED DATA PAPER

When ordering please state if sheets are to be punched to fit binder.

CROSS SECTION SHEETS

Same number of divisions per inch both ways



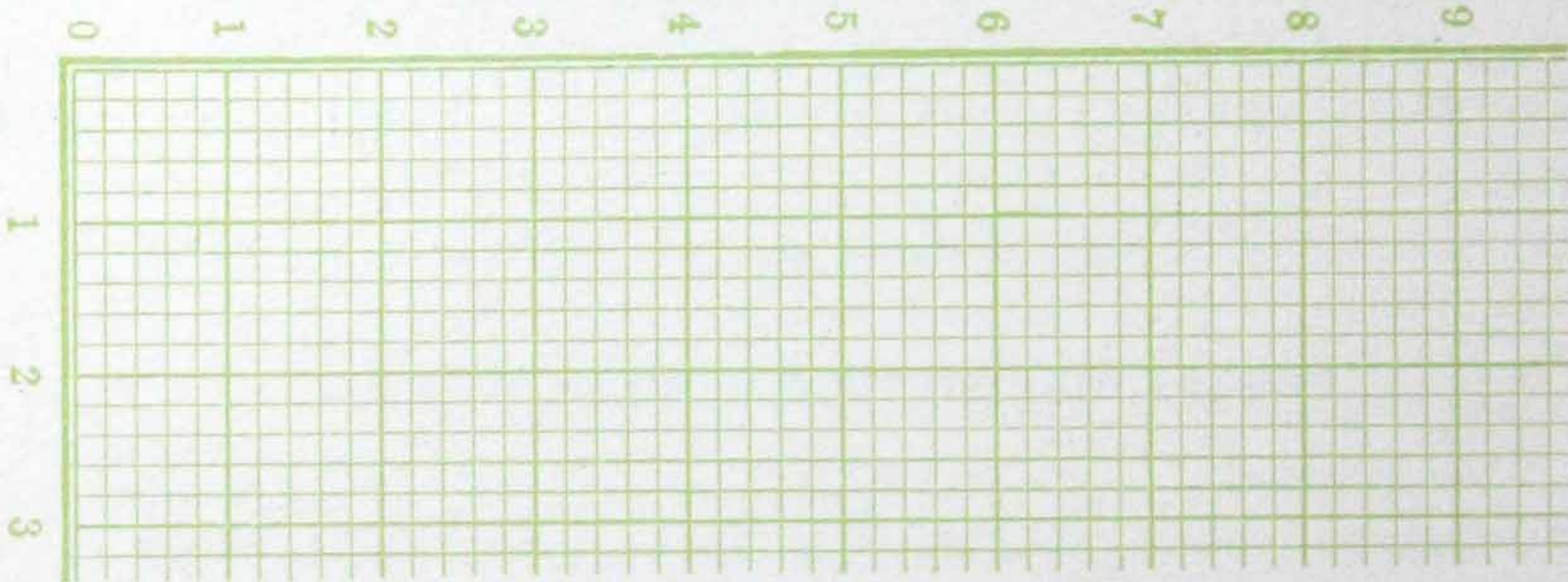
	Size of Sheet	Kind of Engraving	Per 100	Per Sheet
			Code Word	
No. 915.	8½x11 inches	4x4 divisions per inch.....	HAYCOCK	
No. 916.	8½x11 "	5x5 " " "	HAYSTACK	
No. 916A.	8½x11 "	8x8 " " "	HAYRACK	
No. 916B.	8½x11 "	10x10 " " "	HAYWIRE	
No. 917.	8½x11 "	12x12 " " "	HAYWARD	
No. 924.	8½x11 "	16x16 " " "	HAYWORT	

CROSS SECTION SHEETS

Divided into different divisions per unit one way from what they are the other.

	Size of Sheet	Kind of engraving	Code Word
No. 919.	8½x11 inches	6x8 divisions per unit.....	HAZARD
No. 920.	8½x11 "	12x10 " " "	HAZEL
No. 921.	8½x11 "	12x20 " " "	HAZY

SHEETS DIVIDED IN METRIC UNITS



No. 923

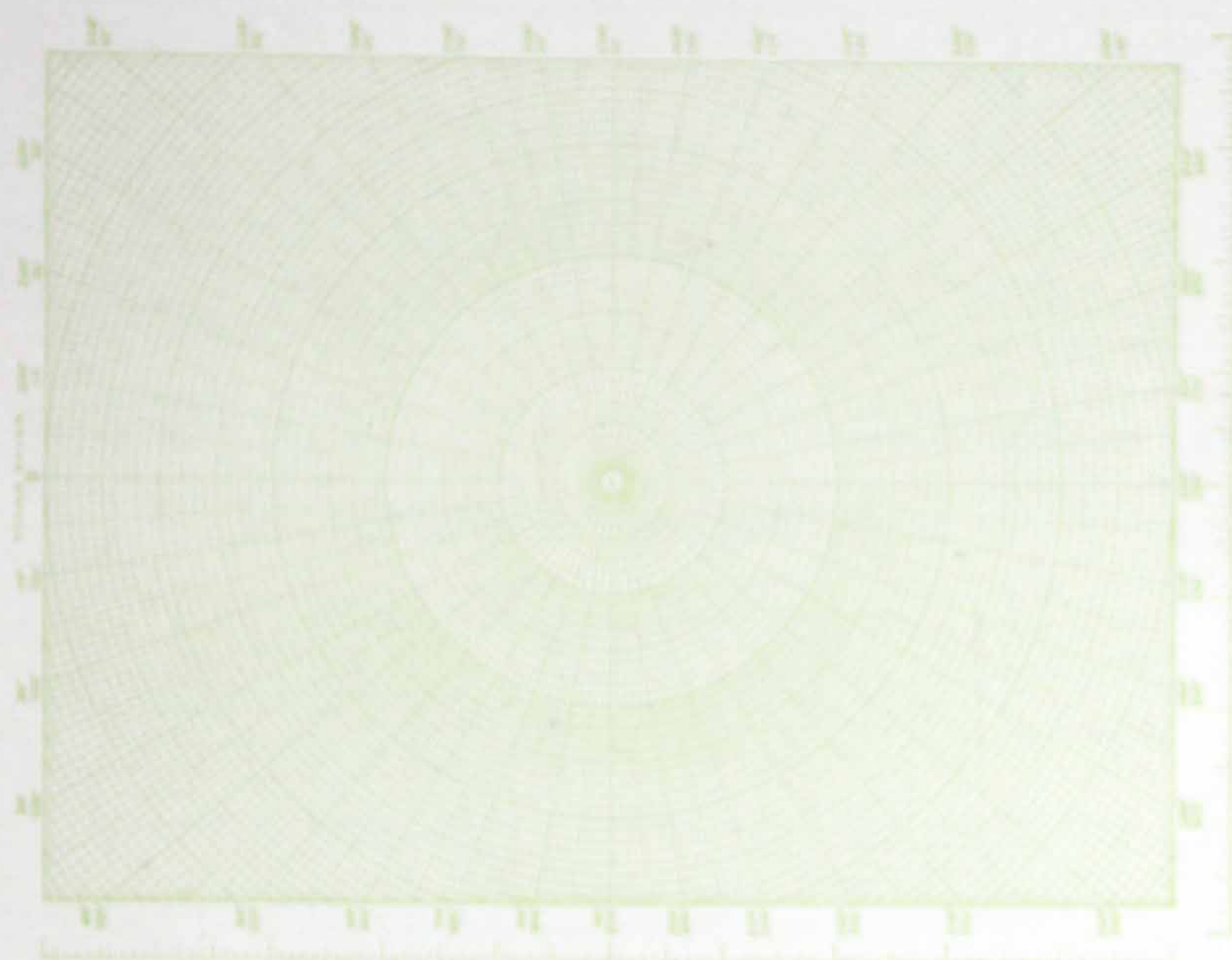
	Size of Sheet	Kind of engraving	Code Word
No. 922.	8½x11 inches	Millimeters 5th lines heavy.....	HEABERT
No. 923.	8½x11 "	2 Millimeters numbered every centi-meter on two edges.....	HEADER

SEE PRICE LIST IN BACK OF CATALOG

LIETZ ENGRAVED DATA PAPER

When ordering please state if sheets are to be punched to fit binder.

POLAR CO-ORDINATE PAPER



No. 924 1/2

	Size of Sheet	Kind of engraving	Per 100 Code Word	Per Sheet
No. 924 1/2.	8 1/2 x 11 inches	Polar Co-ordinate.....	HEADLAND	

LOGARITHMIC PAPERS

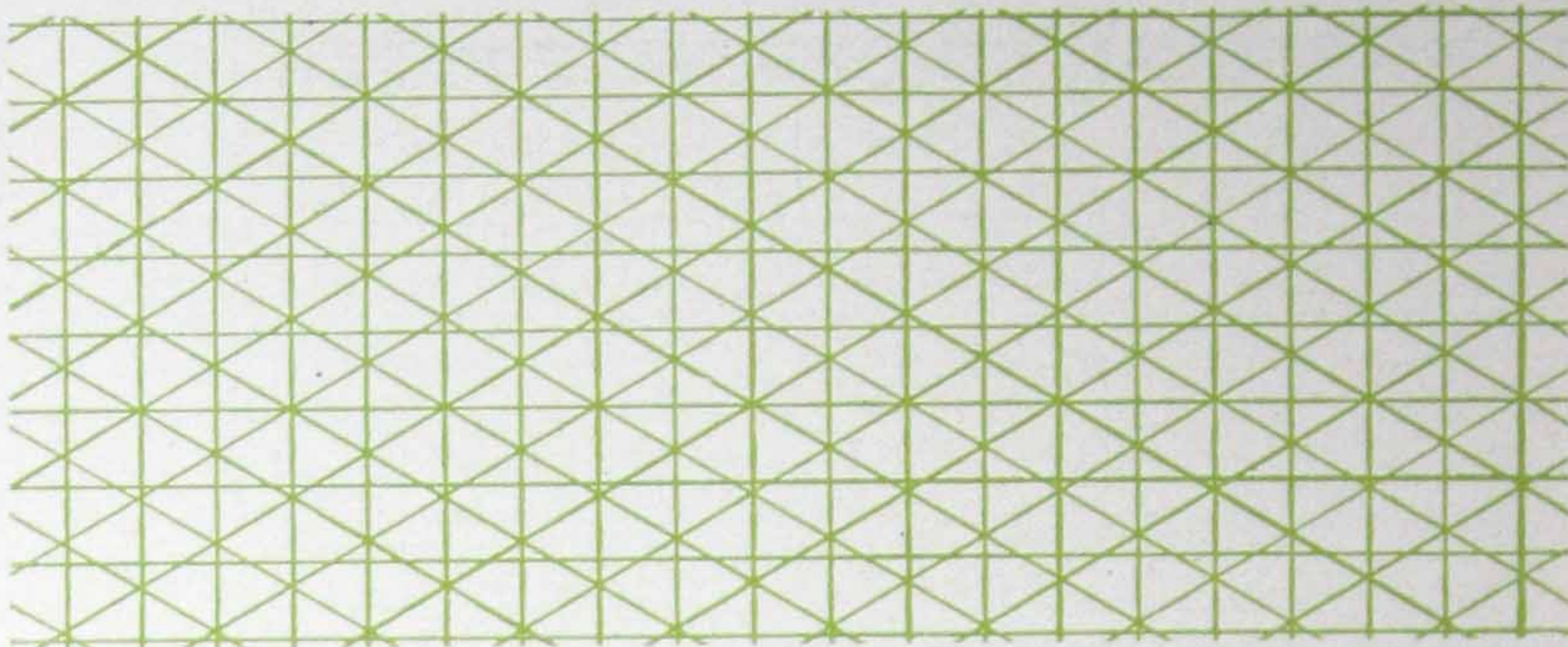
	Size of Sheet	Kind of engraving	Code Word
No. 927A.	8 1/2 x 11 inches	12X logarithmic, one cycle 9 inches.	HEADMAN
No. 927B.	8 1/2 x 11 "	12X logarithmic, two cycles 4 1/2 inches.....	HEADWIND
No. 927C.	8 1/2 x 11 "	12X logarithmic, three cycles 3 inches.....	HEADSTRONG
No. 927D.	8 1/2 x 11 "	20X logarithmic, two cycles 2 3/4 inches.....	HEADWIN

For other Logarithmic Papers see page 174.

SEE PRICE LIST IN BACK OF CATALOG

ISOMETRIC SKETCHING PAPER

For Making Drawings and Sketches in Isometric Perspective.



No. 928. Engraving 9x12 in. on ledger paper, green only.....

Code Word
HEARTH

Quire Sheet

TOWNSHIP PAPERS

Township No.		Range No.		Meridian.	
6	5	4	3	2	1
7	6	5	4	3	2
8	7	6	5	4	3
9	8	7	6	5	4
10	9	8	7	6	5
11	10	9	8	7	6
12	11	10	9	8	7
13	12	11	10	9	8
14	13	12	11	10	9
15	14	13	12	11	10
16	15	14	13	12	11
17	16	15	14	13	12
18	17	16	15	14	13
19	18	17	16	15	14
20	19	18	17	16	15
21	20	19	18	17	16
22	21	20	19	18	17
23	22	21	20	19	18
24	23	22	21	20	19
25	24	23	22	21	20
26	25	24	23	22	21
27	26	25	24	23	22
28	27	26	25	24	23
29	28	27	26	25	24
30	29	28	27	26	25
31	30	29	28	27	26
32	31	30	29	28	27
33	32	31	30	29	28
34	33	32	31	30	29
35	34	33	32	31	30
36	35	34	33	32	31
37	36	35	34	33	32
38	37	36	35	34	33
39	38	37	36	35	34
40	39	38	37	36	35
41	40	39	38	37	36
42	41	40	39	38	37
43	42	41	40	39	38
44	43	42	41	40	39
45	44	43	42	41	40
46	45	44	43	42	41
47	46	45	44	43	42
48	47	46	45	44	43
49	48	47	46	45	44
50	49	48	47	46	45
51	50	49	48	47	46
52	51	50	49	48	47
53	52	51	50	49	48
54	53	52	51	50	49
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56	55	54	53	52	51
57	56	55	54	53	52
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62	61	60	59	58	57
63	62	61	60	59	58
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65	64	63	62	61	60
66	65	64	63	62	61
67	66	65	64	63	62
68	67	66	65	64	63
69	68	67	66	65	64
70	69	68	67	66	65
71	70	69	68	67	66
72	71	70	69	68	67
73	72	71	70	69	68
74	73	72	71	70	69
75	74	73	72	71	70
76	75	74	73	72	71
77	76	75	74	73	72
78	77	76	75	74	73
79	78	77	76	75	74
80	79	78	77	76	75
81	80	79	78	77	76
82	81	80	79	78	77
83	82	81	80	79	78
84	83	82	81	80	79
85	84	83	82	81	80
86	85	84	83	82	81
87	86	85	84	83	82
88	87	86	85	84	83
89	88	87	86	85	84
90	89	88	87	86	85
91	90	89	88	87	86
92	91	90	89	88	87
93	92	91	90	89	88
94	93	92	91	90	89
95	94	93	92	91	90
96	95	94	93	92	91
97	96	95	94	93	92
98	97	96	95	94	93
99	98	97	96	95	94
100	99	98	97	96	95

ON LEDGER PAPER

No. 933. Township Plat, 8½x11", 1-inch Sections. In black, blue, red and violet.....

No. 934. Township Plat, 8½x11", 1 Township, ¾-inch Sections. Extra section all around township. In black, blue, red and violet.....

No. 935. Township Plat, 8½x11", 1 Township, 1-inch Sections. Extra section all around township. In black, blue, red and violet.....

No. 937. Township Plat, 14x17", with margin for binding, 2-inch Sections. In black, blue, red and violet.....

No. 940. Township Plat, 16x21", 12 Townships, ¾-inch Sections. In black, red, violet and green.....

Code Word
HEATER
HEATHEN
HEATHER
HEATHY
HEAVER

Per 100 Each

ON TRACING PAPER

No. 943. Township Plat, 14x17", 2-inch Sections. In black only.....

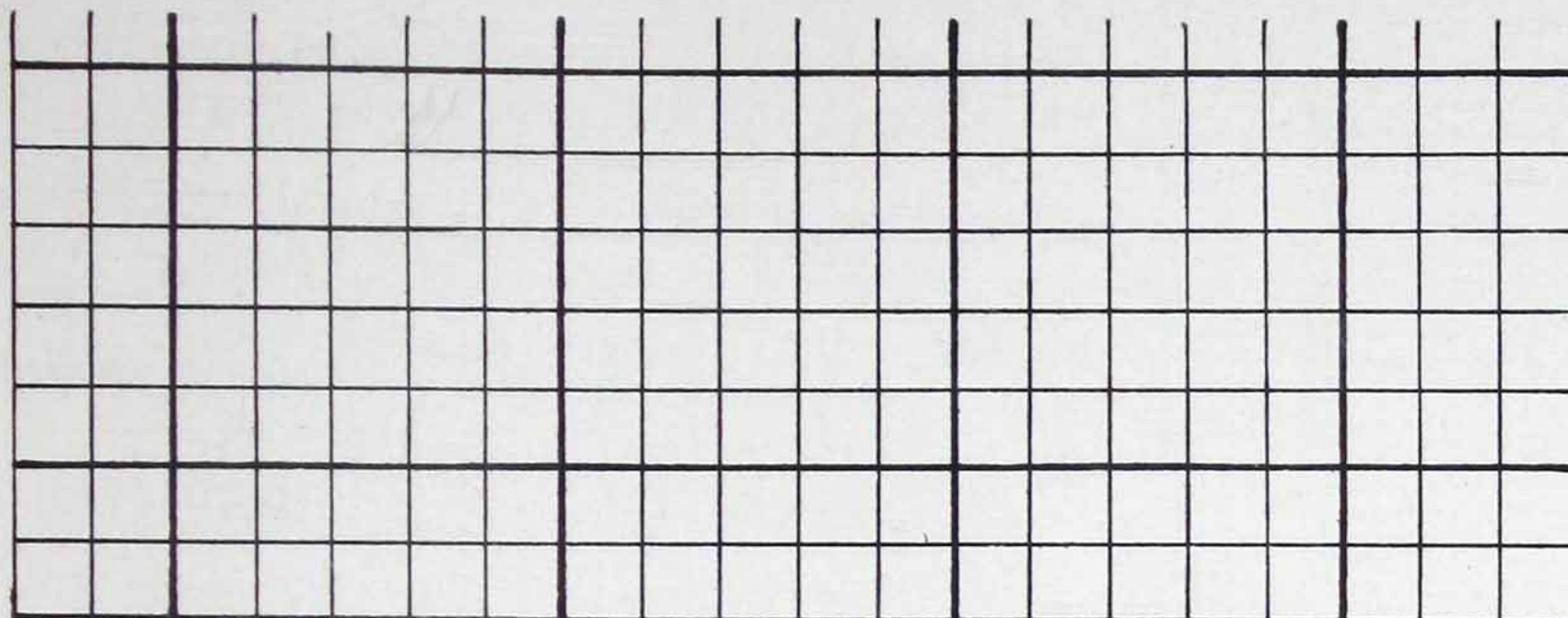
Code Word
HEAVIT

Per 100 Each

SEE PRICE LIST IN BACK OF CATALOG

RULED CROSS SECTION PAPER IN SHEETS

On Drawing Paper



Inch Lines Heavy

Ream Quire Sheet
Code Word

- No. 949. Sheets 17x22 inches, ruled in blue, 2x2 to one inch. **HECA**
No. 950. Sheets 17x22 inches, ruled in blue, 5x5 to one inch. **HECATO**
No. 951. Sheets 17x22 inches, ruled in blue, 8x8 to one inch. **HECTARE**
No. 952. Sheets 17x22 inches, ruled in blue, 10x10 to one inch. **HECTOR**

TOPOGRAPHIC PAPER

On Drawing Paper

Ream Quire Sheet

- No. 954. Sheets 17x22 inches, ruled red and blue, 400 feet to 1 inch. **HEDGEHOG**

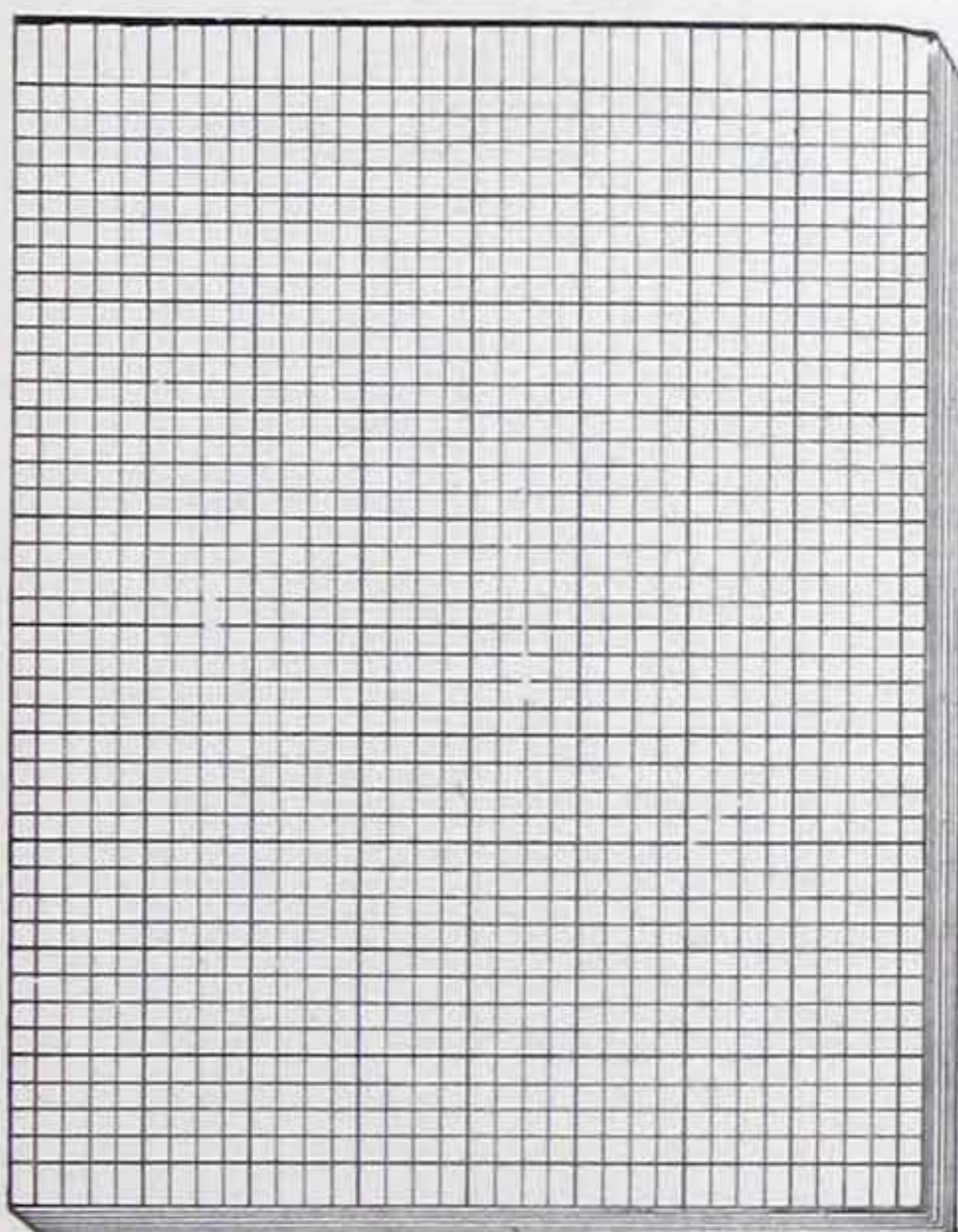
QUADRILLE RULED PAPER IN SHEETS

On Drawing Paper

All lines equally heavy, inch lines not heavier.

Ream Quire Sheet
Code Word

- No. 955. Sheets 17x22 inches, ruled in blue, 4x4 to one inch. **HEDONIC**
No. 956. Sheets 17x22 inches, ruled in blue, 6x6 to one inch. **HEDORUM**



CROSS SECTION PADS

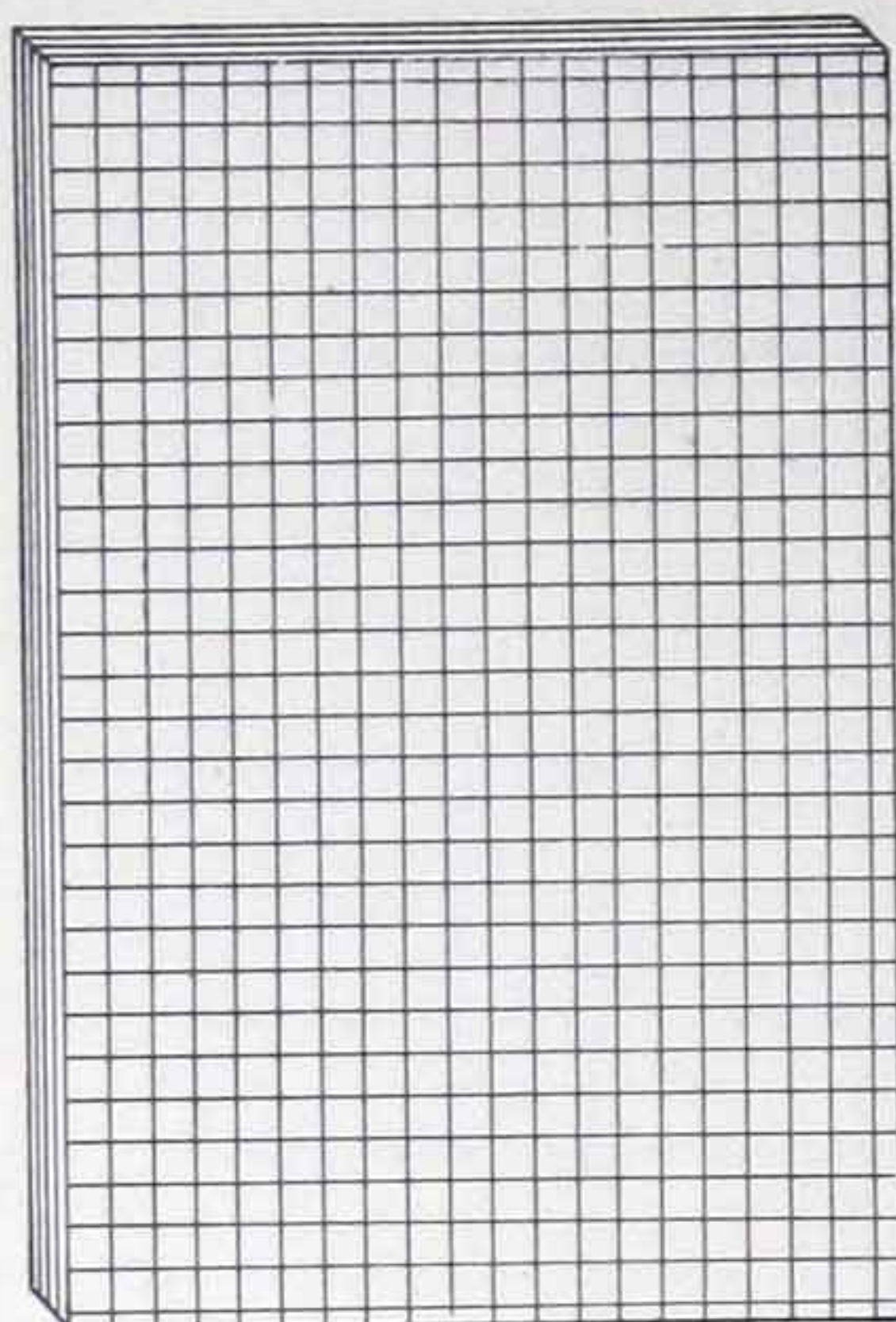
These Cross Section Pads are made of high grade white paper, and contain 50 leaves each.

Inch lines heavy

Doz. Each
Code Word

- No. 961. 8½x11 inches 10 squares to the inch. **HELIAC**
No. 962. 8½x11 inches, 8 squares to the inch. **HELICOID**
No. 963. 8½x11 inches, 4 squares to the inch. **HELIO**

SEE PRICE LIST IN BACK OF CATALOG



QUADRILLE RULED PADS

High grade Yellow Paper. Gummed side and top. 80 leaves to pad. **All lines ruled equally heavy.**

- | | | Code Word |
|-----------------|--|-------------------|
| No. 967. | 8½x11 inches, ruled 4 squares to the inch..... | HELIO |
| No. 968. | 8½x11 inches, ruled 8 squares to the inch..... | HELIOTROPE |
| No. 969. | 8½x11 inches, ruled 6 squares to the inch..... | HELIOTYPE |

FIGURING PADS

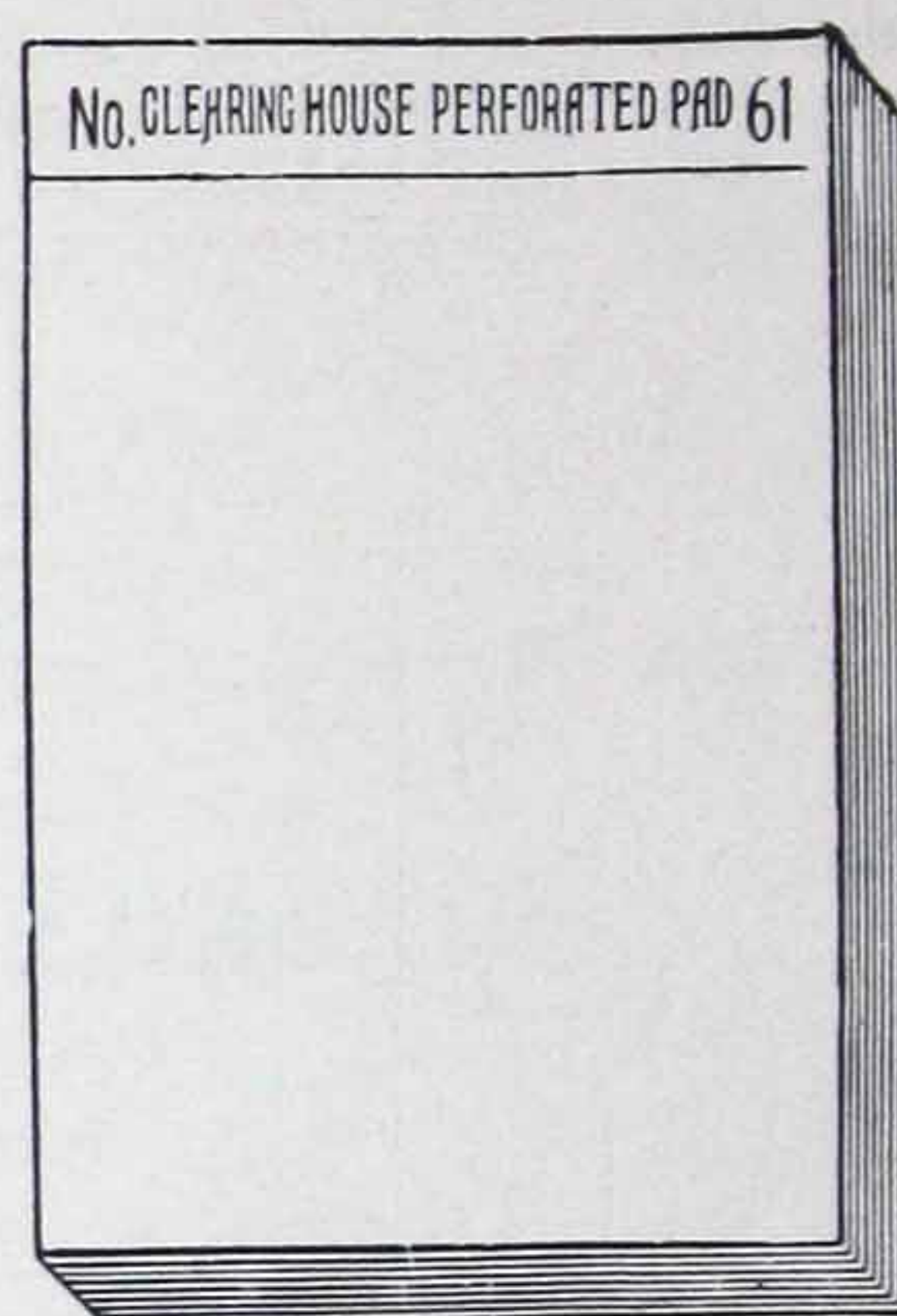
Nos. 975-979 Figuring Pads are made of high grade Canary writing paper adapted for pen or pencil use. Tops of leaves perforated for removal. 72 leaves to pad.

- | | Doz. | Each | |
|-----------------|------------------|------|----------------|
| No. 975. | 4x 6 inches..... | | HELOT |
| No. 977. | 5x 8 inches..... | | HELVE |
| No. 978. | 6x 9 inches..... | | HEMA |
| No. 979. | 8x12 inches..... | | HEMATIN |

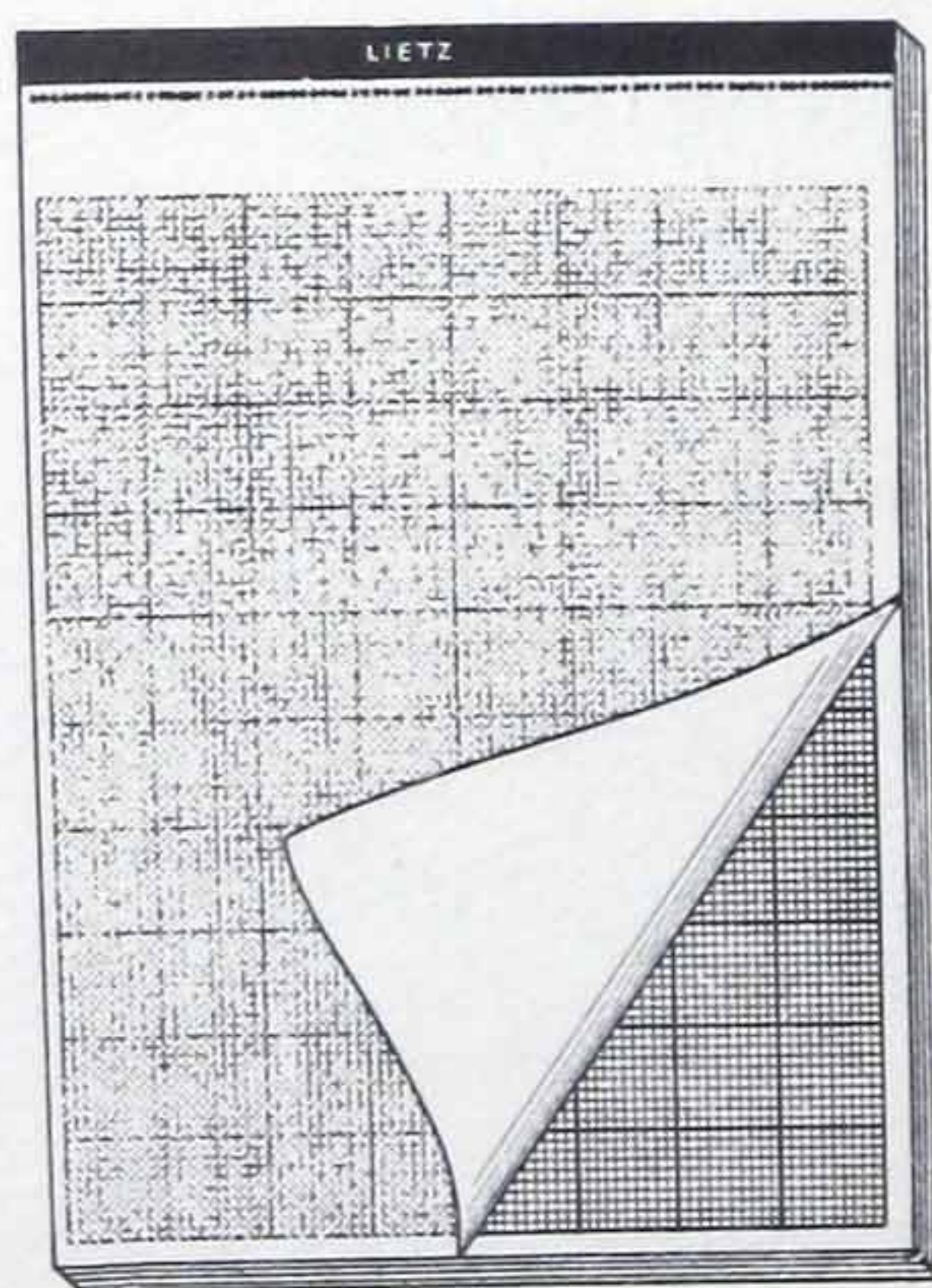
LEGAL TABLETS

These Commercial Tablets are made of good grade Manila writing paper ruled on both sides. 50 leaves to tablet.

- | | Doz. | Each | Code Word |
|-----------------|------------------------|------|-------------|
| No. 980. | 8x12½ with margin..... | | HEMO |



Nos. 975-979



No. 990

TRACING PAPER SKETCHING PADS

Excellent for layout work and for quick and accurate sketching. Pads consist of 50 sheets of our No. 1128 Colusa Tracing Paper.

- | | | Code Word |
|-----------------|---|---------------|
| No. 990. | *Colusa Sketching Pad, size of sheets 9x12 inches.... | HEMUS |
| No. 991. | Colusa Sketching Pad, size of sheets 12x18 inches.. | HEMUTE |

*A sheet of ruled Cross section paper is furnished with each pad, No. 990.

SEE PRICE LIST IN BACK OF CATALOG

DRAWING PAPERS

We deem it unnecessary to make much comment on an article so universally used. The draftsman has learned of its qualities from his earliest experiences, so we only desire to assure our friends that the papers we carry represent the standards of excellence for the respective purposes for which they are intended.

No. 999. AMERICAN WATER COLOR PAPER. Rough surface made especially for water color work. A very reliable yet inexpensive paper. The heavy body of this stock will withstand unusual abuse and heavy water color washes.

Size—Inches

Ream Quire Sheet
Code Word

22x30.....**HIAD**

No. 1000. WHATMAN'S Hand-Made Drawing Paper, with H. P. (smooth surface), C. P. (finely grained surface).

Ream Quire Sheet
Code Word

Demy.....15x20 inches.....**HIALEM**

Royal.....19x24 inches.....**HIAND**

Imperial.....22x30 inches.....**HIAPE**

Double Elephant....27x40 inches.....**HIART**

Antiquarian.....31x53 inches.....**HIASTER**

No. 1004. "ANGELUS" Drawing Paper. The very best white drawing paper. Smooth hard surface. Unexcelled for ink drawings. Exceptional erasing qualities. All sizes are of the same thickness.

Ream Quire Sheet
Code Word

Size—Inches

19x24.....**HICKY**

22x30.....**HICKSON**

27x40.....**HICKMORE**

Samples of any of our papers sent on application.

SEE PRICE LIST IN BACK OF CATALOG

WHITE DRAWING PAPERS IN SHEETS



No. 1002. CARMEL Drawing Paper. A pure white paper of exceptional quality with smooth surface suitable for ink, pencil or water color.

Size—Inches	Ream	Quire Code Word	Sheet
19x24.....		HIBACK	
22x30.....		HIBAD	
27x40.....		HIBALL	

No. 1005. "ORLAND" Drawing Paper. A pure white drawing paper of highest quality. Very tough, with smooth hard surface. Will stand erasing perfectly. An excellent paper for ink line drawings.

Size—Inches	Ream	Quire Code Word	Sheet
19x24.....		HIDAL	
22x30.....		HIDER	
27x40.....		HIDEVER	

No. 1006. "SEQUOIA" Drawing Paper. A pure white drawing paper of very high quality. Medium surface. Adapted for pencil, ink or color work, and will stand erasing perfectly. An excellent paper for school or college work.

Size—Inches	Ream	Quire Code Word	Sheet
19x24.....		HIFEVER	
22x30.....		HIFIRE	
27x40.....		HIFIT	

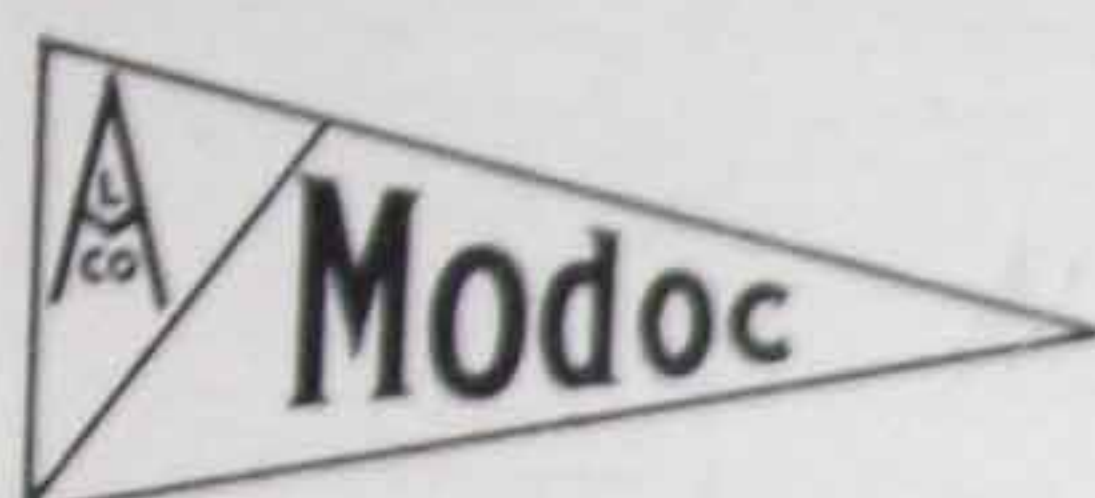
No. 1007. "PACIFIC" Drawing Paper. A white drawing paper of good quality. Slightly grained surface, adapted for pencil, ink, crayon or color work. Very suitable for use in schools, etc.

Size—Inches	Ream	Quire Code Word	Sheet
19x24.....		HIJOLE	
22x30.....		HIKER	
27x40.....		HIKORE	

Samples of any of our Papers sent on application.

SEE PRICE LIST IN BACK OF CATALOG

CREAM DRAWING AND DETAIL PAPERS IN SHEETS



No. 1008. "MODOC" Drawing Paper. A cream color drawing paper of superior quality. It is tough, hard, uniform in grain and finish, stands erasing perfectly, and is an excellent paper for pencil, ink or color work. Will stand handling without soiling. All sizes are of the same thickness.

Size—Inches	Ream	Quire Code Word	Sheet
19x24.....		HILAND	
22x30.....		HILARO	
27x40.....		HILATE	

"Modoc" Drawing Paper in rolls, see Catalog No. 1080.

No. 1009. "MOHAVE" Drawing Paper. A cream color drawing paper of very good quality. It is strong, uniform in grain and finish, stands erasing, and takes ink and color well. An excellent paper for schools and general drawing. All sizes are of the same thickness.

Size—Inches	Ream	Quire Code Word	Sheet
19x24.....		HIMON	
22x30.....		HIMORE	
27x40.....		HIMILL	

"Mohave" Drawing Paper in rolls, see Catalog No. 1081.

No. 1010. "ELSINORE" Detail Paper. A tough paper of grained surface, a trifle darker in shade than the cream papers, possessing good erasing qualities. Suitable for either ink or pencil. All sizes are of the same thickness.

Size—Inches	Ream	Quire Code Word	Sheet
9x12.....		HINEL	
12x18.....		HINICK	
18x24.....		HINTER	
24x36.....		HINSON	

"Elsinore" Detail Paper in rolls, see Catalog No. 1086B.

Samples of any of our papers sent on application.

SEE PRICE LIST IN BACK OF CATALOG

BOTANY OR BIOLOGY PAPER

- No. 1013.** Good quality white drawing paper. Will take pencil, ink or water color.
- | | |
|--------------------------------------|-------------------------|
| Size-Inches | 500 Sheets
Code Word |
| 8½x11—Punched for 3-ring Binder..... | HIOTA |

MOUNTING, POSTER AND MAT BOARDS

- No. 1014.** Lietz Artists' Illustration Board, white, 100/1000 inch thick. A fine quality medium surface for general drawing and water color.
- | | |
|---------------------------------|--------------------|
| | Dozen
Code Word |
| Size of Board 30x40 inches..... | HIPSO |
- No. 1016.** Strathmore Illustrating Board. A superior quality water color paper with medium surface, mounted on heavy board.
- | | |
|---------------------------------|---------------|
| Size of Board 30x40 inches..... | HIPTON |
|---------------------------------|---------------|
- No. 1017.** Gray Pulp Mounting Board, 65/1000 inch thick. Especially adapted for mounting purposes.
- | | |
|---------------------------------|----------------|
| Size of Board 30x40 inches..... | HIRCINE |
|---------------------------------|----------------|
- No. 1018A.** Cream and White Mat Board, pebbled surface, 50/1000 inch thick. Cream on one side, white on other.
- | | |
|---------------------------------|-----------------|
| Size of Board 30x40 inches..... | HIRELING |
|---------------------------------|-----------------|
- No. 1018B.** Same as No. 1018A but 100/1000 inch thick.
- | | |
|---------------------------------|----------------|
| Size of Board 30x40 inches..... | HIRSUTE |
|---------------------------------|----------------|
- No. 1019.** Cream and White Student Artist Board, 55/1000 inch thick, medium surface. Cream on one side, white on other. An especially fine sheet at a moderate cost.
- | | |
|---------------------------------|--------------|
| Size of Board 30x40 inches..... | HIRTY |
|---------------------------------|--------------|

HI-ART DRAWING BRISTOL

A superior quality Bristol Board, made in two finishes, S. (smooth or high surface) for Pen and Ink Drawing, and M. (medium, or dull surface) for Pencil, Pen and Water Color work, in 1, 2, and 3 sheet thicknesses.

When ordering please state surface and thickness desired.

- No. 1020.** Hi-Art Drawing Bristol, size 23x29 inches.
with S. (smooth or high surface) or M. (medium or dull surface).

	Code Word		Code Word
1 Ply Smooth.....	HISEL	2 Ply Medium.....	HISENOX
1 Ply Medium.....	HISELER	3 Ply Smooth.....	HISERO
2 Ply Smooth.....	HISENA	3 Ply Medium.....	HISETAL

SEE PRICE LIST IN BACK OF CATALOG

CHARCOAL PAPERS

		Per ream Code	Quire Word	Sheet
No. 1028.	"Paramount" Charcoal Paper. Fine quality white domestic charcoal paper, of good rag content, recommended for student and school use. Size 19x25 inches.			HITMORE

BRISTOL BOARDS

		Per 100 Code	Dozen Word	Each
No. 1032.	Domestic Bristol Board, ordinary grade, 3 ply, size 22x28 inches.			HITOP
No. 1037.	Reynolds' Patent Office Bristol Board, U. S. Standard, 3-ply with title and border.	Gross	Dozen	Each
				HIWAR
No. 1038.	Reynolds' Patent Office Bristol Board, U. S. Standard, 3-ply not printed.			HIWON

ADHESIVE PAPER AND CLOTH TAPES

For the binding of drawings to prevent tearing



No. 1042-44

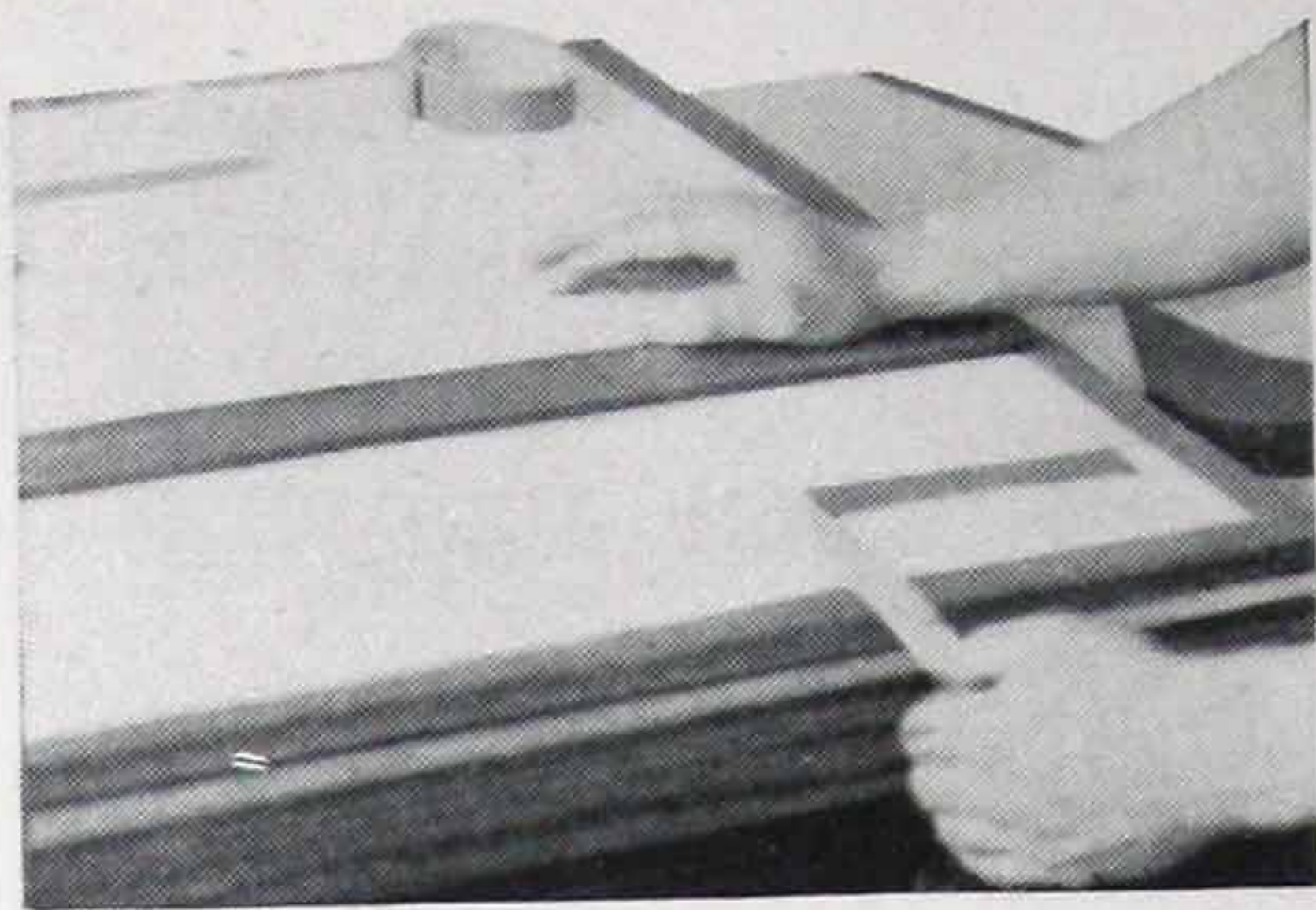


No. 1046-47

		Per doz. Code	Per spoo Word
No. 1042.	Handy Roll Opaque White Cloth Tape, 360 inches, $\frac{7}{8}$ inches wide.		HOAMI
No. 1043.	Handy Roll Transparent Paper Tape, 1000 inches, $\frac{1}{2}$ inch wide.		HOAR
No. 1044.	Handy Roll Transparent Paper Tape, 800 inches, $\frac{7}{8}$ inch wide.		HOARD
No. 1045.	Adhesive Transparent Paper Tape, in rolls of $3\frac{1}{2}$ yards, $\frac{5}{8}$ inch wide.		HOARSE
No. 1046.	White Gummed Cloth Tape, in rolls of 10 yards, $\frac{3}{4}$ inch wide.		HOAX
No. 1047.	Same as No. 1046, but $1\frac{1}{4}$ inches wide.		HOB
No. 1048.	Transparent, Gummed Cloth Tape, in rolls of 10 yards, $\frac{3}{4}$ inch wide.		HOBBY

SEE PRICE LIST IN BACK OF CATALOG

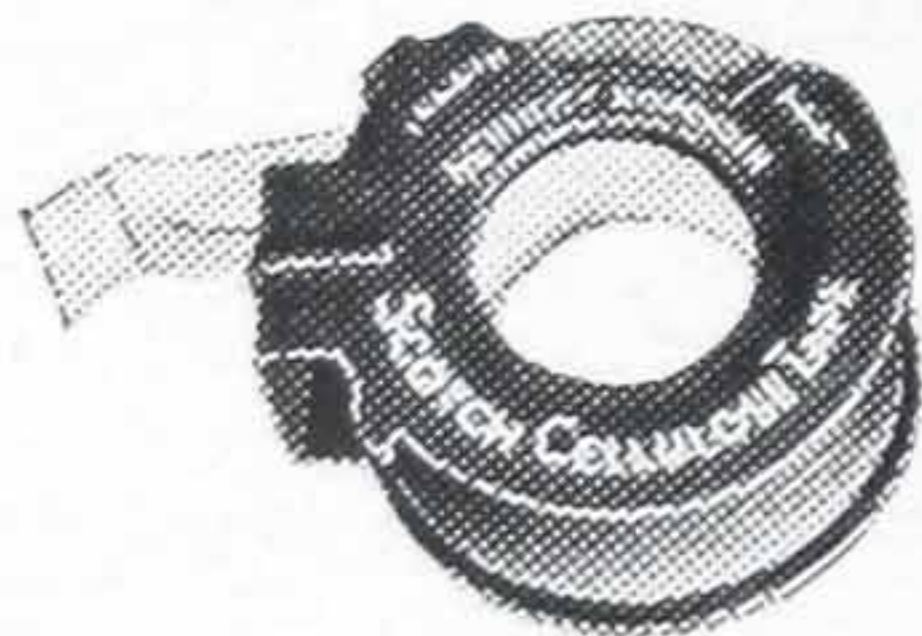
SCOTCH DRAFTING TAPE



A better method of holding paper or tracing cloth to the drawing board. Scotch Drafting Tape is used instead of thumbtacks. Holds down the edges securely and prevents torn and curled drawings. T Square and triangles slide over the paper without interference. Instantly adhesive without moistening, and can be used repeatedly. Easily removed and will not injure the finest papers.

- No. 1049A. Scotch Drafting Tape, 1" wide in rolls of 10 yards.
- No. 1049B. Scotch Drafting Tape, 1" wide in rolls of 72 yards
- Code Word
HOBBER
HOBBO

SCOTCH CELLULOSE TAPE



This tape is 100 per cent transparent, requires no moistening, seals instantly with slight pressure. Excellent for mending prints, tracings, torn book pages, etc., or for holding bulletins to blackboards.

- No. 1050. Scotch Cellulose Tape in Utility Dispenser, 1/2 inch by 180 inches.
- No. 1051. Scotch Cellulose Tape in Utility Dispenser, 3/4 inch by 360 inches.
- Code Word
HOBOLT
HOBROW

WHITE DRAWING PAPERS IN ROLLS

No. 1060. "LASSEN" Drawing Paper, Medium. A pure white drawing paper of highest quality. Very tough with a hard, slightly grained surface, will stand erasing perfectly. An excellent paper for all kinds of finished drawings, for pen, ink and water color, for outdoor work or for use in shops, where drawings are subject to much handling.

	Per roll of 25 yds.	10 yds.	Per yd.
36 inches wide. Code Word	HOBART	HOB	
42 inches wide. " "	HOBEL	HOB	
63 inches wide. " "	HOBHAIL	HOB	
In original rolls of about 40 pounds, any width; per pound.			HOBSON

No. 1061. "LASSEN" Drawing Paper, Heavy. Same as No. 1060 but heavier.

	Per roll of 25 yds.	10 yds.	Per yd.
63 inches wide. Code Word	HOCK	HOCKTER	
72 inches wide. " "	HOCKSIN	HOCKWIN	
In original rolls of about 40 pounds, any width; per pound.			HOCKEY

SEE PRICE LIST IN BACK OF CATALOG

WHITE DRAWING PAPERS IN ROLLS

No. 1064. "RAMONA" Drawing Paper, Medium. A high-grade white drawing paper, with **Eggshell** surface. For all kinds of finished drawings, for pen, ink, water color or airbrush work.

		Per roll of 25 yds.	10 yds.	Per yd.
36 inches wide.....	Code Word	HOD	HODOVER	
42 inches wide.....	" "	HODAL	HODMAN	
63 inches wide.....	" "	HODNIP	HODTACK	
In original rolls of about 40 pounds, any width; per pound.....			HODWAR	

No. 1065. "RAMONA" Drawing Paper, Heavy. Same as No. 1064 but heavier.

		Per roll of 25 yds.	10 yds.	Per yd.
63 inches wide.....	Code Word	HOE	HOEWARE	
In original rolls of about 40 pounds; per pound.....			HOEWAX	

No. 1068. "BELMONT" Drawing Paper, Medium. A pure white drawing paper of superior quality. Very tough and strong, **smooth** surface. Can be folded without breaking. Especially adapted for mapping and general working drawings subject to rough handling.

		Per roll of 25 yds.	10 yds.	Per yd.
36 inches wide.....	Code Word	HOER	HOFIST	
63 inches wide.....	" "	HOFLY	HOFMAN	
In original rolls of about 40 pounds, any width; per pound.....			HOFTACK	

No. 1069. "BELMONT" Drawing Paper, Heavy. Same as No. 1068 but heavier.

		Per roll of 25 yds.	10 yds.	Per yd.
63 inches wide.....	Code Word	HGBIN	HGPEN	
In original rolls of about 40 pounds; per pound.....			HOGTIE	

No. 1070. "AVENA" Drawing Paper. A pure white drawing paper with excellent erasing qualities. The surface is slightly grained, making it desirable for ink, pencil or water color work.

		Per roll of 50 yds.	10 yds.	Per yd.
30 inches wide.....	Code Word	HOILE	HOLLER	
36 inches wide.....	" "	HOIST	HOLLY	
42 inches wide.....	" "	HOISTER	HOLM	
60 inches wide.....	" "	HOISTY	HOLMARK	
In original rolls of about 40 pounds, any width; per pound.....			HOLSTER	

Samples of any of our papers will be mailed on application.

SEE PRICE LIST IN BACK OF CATALOG

DRAWING AND DETAIL PAPERS IN ROLLS



CREAM DRAWING PAPER

No. 1080. "MODOC" Drawing Paper. The highest grade cream color Drawing and Detail Paper. The surface is hard, slightly grained, and takes pencil, ink or water color. The erasing qualities are excellent. The cream or buff color is pleasing to the eye and permits much handling without soiling.

The same paper in sheets, see No. 1008.

		Per roll of 50 yds.	10 yds.	Per yd.
30 inches wide.....	Code Word:	HOPE	HOPVINE	
36 inches wide.....	" "	HOPPER	HOPLAND	
42 inches wide.....	" "	HOPPET	HOPVILLE	
63 inches wide.....	" "	HOPPY	HOPTOWN	
In original rolls of about 40 pounds, any width; per pound.....				HOPWING

No. 1081. "MOHAVE" Drawing Paper. A cream color drawing and detail paper with good erasing qualities. It is strong, of uniform grain and finish, and is an excellent paper for schools and all general drawing. Will take ink and water color.

The same paper in sheets, see No. 1009.

		Per roll of 50 yds.	10 yds.	Per yd.
30 inches wide.....	Code Word:	HORACE	HORIZON	
36 inches wide.....	" "	HORAN	HORLIC	
42 inches wide.....	" "	HORATI	HORRIF	
In original rolls of about 40 pounds, any width; per pound.....				HORSEY

GREEN DRAWING PAPER

No. 1084. "ENCINAL" Drawing Paper. A light green drawing paper similar in texture and surface to our No. 1080 Modoc Drawing Paper. Its color is restful to the eye and permits much handling without soiling.

		Per roll of 50 yds.	10 yds.	Per yd.
36 inches wide.....	Code Word:	HORTAN	HORTILE	
42 inches wide.....	" "	HORTACK	HORTICAL	
In original rolls of about 40 pounds, per pound.....				HORWIN

SEE PRICE LIST IN BACK OF CATALOG.

DETAIL PAPERS IN ROLLS



BUFF COLOR DETAIL PAPERS

No. 1086A. "EL SINORE" Detail Paper, Thin. A buff color detail paper, of a darker shade than our cream drawing papers, made of selected rag stock. It has a slightly grained surface, will take ink or pencil and erases well. Will stand rough handling and lies perfectly flat on drawing board.

		Per roll of 100 yds.	50 yds.	10 yds.	Per yd.
36 inches wide.....	Code Word	HOSIER	HOSE		
42 inches wide.....	" "	HOSPICE	HOSEMAN		
In original rolls of about 100 to 150 pounds, per pound.....			HOSER		

No. 1086B. "EL SINORE" Detail Paper, Medium. Same as No. 1086A but of medium heavy weight.

The same paper in sheets see No. 1010.

		Per roll of 100 yds.	50 yds.	10 yds.	Per yd.
36 inches wide.....	Code Word	HOSTAGE	HOSTLER		
42 inches wide.....	" "	HOSTEL	HOSTIER		
48 inches wide.....	" "	HOSTESS	HOSTIVE		
54 inches wide.....	" "	HOSTILE	HOSTACK		
In original rolls of about 100 to 150 pounds, per pound.....			HOSTIG		

No. 1086C. "EL SINORE" Detail Paper, Heavy. Same as No. 1086A but extra heavy.

		Per roll of 100 yds.	50 yds.	10 yds.	Per yd.
36 inches wide.....	Code Word	HOTBED	HOTMIRE		
42 inches wide.....	" "	HOTBIN	HOTNOCK		
48 inches wide.....	" "	HOTBOX	HOTPACK		
54 inches wide.....	" "	HOTEL	HOTTEN		
In original rolls of about 100 to 150 pounds, per pound.....			HOTTIRE		

Samples of any of our papers will be mailed on application.

SEE PRICE LIST IN BACK OF CATALOG

MOUNTED DRAWING PAPERS IN SHEETS

These Papers are mounted on the best quality muslin to give strength so that they will not tear or break. Specially adapted for maps and valuable drawings and for plat books, etc.



PAPERS MOUNTED ON ONE SIDE ONLY

No. 1000MS. WHATMAN'S Selected Best Hand-Made Drawing Paper, **Mounted**, with H. P. (smooth surface) or C. P. (finely grained surface). When ordering, please state size and surface desired.

Per Quire Per Sheet

Royal, 19x24 inches
Imperial, 22x30 inches
Double Elephant, 27x40 inches

No. 1060MS. "LASSEN" Drawing Paper, **Mounted**. Same paper as our No. 1060.

Per Quire Per Sheet

Royal, 19x24 inches
Imperial, 22x30 inches
Double Elephant, 27x40 inches

No. 1064MS. "RAMONA" Drawing Paper, **Mounted**. Same paper as our No. 1064.

Per Quire Per Sheet

Royal, 19x24 inches
Imperial, 22x30 inches
Double Elephant, 27x40 inches

DOUBLE-MOUNTED DRAWING PAPERS

Double-Mounted Papers are especially adapted for Atlas or Map work, having muslin in the middle with paper on both sides.

No. 1000DMS WHATMAN'S Selected Best Hand-Made Drawing Paper, **Double Mounted**, with H. P. (smooth surface) or C. P. (slightly grained surface).

When ordering please state size and surface desired.

Per Quire Per Sheet

Royal, 19x24 inches
Imperial, 22x30 inches
Double Elephant, 27x40 inches

No. 1060DMS. "LASSEN" Drawing Paper, **Double Mounted**. Same paper as our No. 1060.

Per Quire Per Sheet

Imperial, 22x30 inches
Double Elephant, 27x40 inches

No. 1064DMS. "RAMONA" Drawing Paper, **Double Mounted**. Same paper as our No. 1064.

Per Quire Per Sheet

Imperial, 22x30 inches
Double Elephant, 27x40 inches

We have a well equipped plant for mounting maps, blue prints, and are prepared to do mounting of any nature. All work guaranteed and orders promptly and accurately executed. Write for estimates.

SEE PRICE LIST IN BACK OF CATALOG

MOUNTED DRAWING PAPERS IN ROLLS

Mounted one side only on the best quality muslin to give strength so that they will not tear or break.

No. 1060M. "LASSEN" Drawing Paper, Mounted. Same paper as our No. 1060.

		Per roll of 10 yds.	Per yd.
36 inches wide.....	Code Word	HUMAL	
42 inches wide.....	" "	HUMARK	
63 inches wide.....	" "	HUMBLE	

No. 1061M. "LASSEN" Drawing Paper, Heavy, Mounted. Same paper as our No. 1061.

		Per roll of 10 yds.	Per yd.
63 inches wide.....	Code Word	HUMER	
72 inches wide.....	" "	HUMERO	

No. 1064M. "RAMONA" Drawing Paper (Eggshell), Mounted. Same paper as our No. 1064.

		Per roll of 10 yds.	Per yd.
36 inches wide.....	Code Word	HUMID	
42 inches wide.....	" "	HUMIDOR	
63 inches wide.....	" "	HUMLER	

No. 1065M. "RAMONA" Drawing Paper, Heavy (Eggshell), Mounted. Same paper as our No. 1065.

		Per roll of 10 yds.	Per yd.
63 inches wide.....	Code Word	HUMMOCK	

No. 1068M. "BELMONT" Drawing Paper, Mounted. Same paper as our No. 1068.

		Per roll of 10 yds.	Per yd.
36 inches wide.....	Code Word	HUMOR	
63 inches wide.....	" "	HUMORIST	

No. 1069M. "BELMONT" Drawing Paper, Heavy, Mounted. Same paper as our No. 1069.

		Per roll of 10 yds.	Per yd.
63 inches wide.....	Code Word	HUMP	

No. 1070M. "AVENA" Drawing Paper, Mounted. Same paper as our No. 1070.

		Per roll of 10 yds.	Per yd.
30 inches wide.....	Code Word	HUMPER	
36 inches wide.....	" "	HUMPY	
42 inches wide.....	" "	HUNCH	
60 inches wide.....	" "	HUNDER	

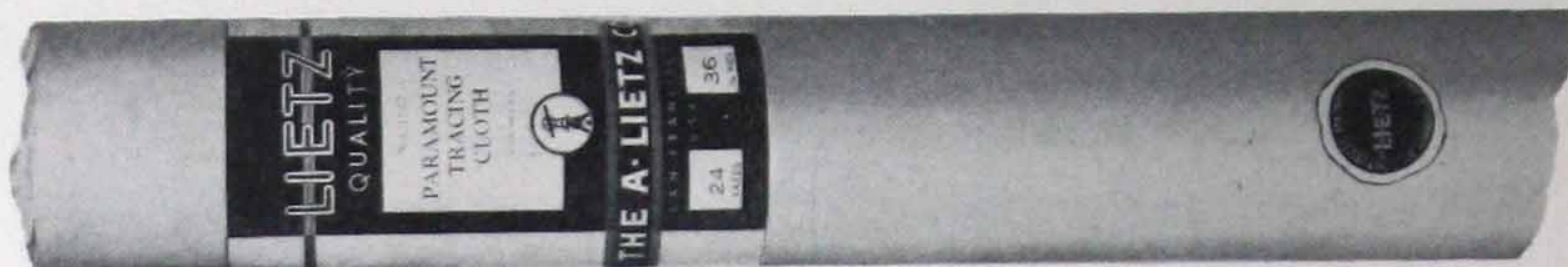
No. 1080M. "MODOC" Cream Drawing Paper, Mounted. Same paper as our No. 1080.

		Per roll of 10 yds.	Per yd.
30 inches wide.....	Code Word	HUNKY	
36 inches wide.....	" "	HUNTER	
42 inches wide.....	" "	HUNTRESS	
63 inches wide.....	" "	HURDLE	

Complete sample book of drawing papers mailed on request.

SEE PRICE LIST IN BACK OF CATALOG

TRACING CLOTHS IN ROLLS



No. 1100. **“EXCELSIOR”** Tracing Cloth. Extra transparent. Glazed on one side and dull on the other.

	Per roll of 24 yds. Code Word	Per yd.
30 inches wide.....	HYACINTH	
36 inches wide.....	HYADES	
42 inches wide.....	HYAL	

No. 1101. **“IMPERIAL”** Tracing Cloth. Glazed on one side and dull on the other.

	Per roll of 24 yds. Code Word	Per yd.
24 inches wide.....	HYALINE	
30 inches wide.....	HYBRID	
36 inches wide.....	HYDRA	
38 inches wide.....	HYDRANT	
42 inches wide.....	HYDRIC	
48 inches wide.....	HYDRIDE	
54 inches wide.....	HYDROGEN	

No. 1102. **“PARAMOUNT”** Tracing Cloth. A high-grade product equal to the best. Glazed on one side and dull on the other.

	Per roll of 24 yds. Code Word	Per yd.
30 inches wide.....	HYMEN	
36 inches wide.....	HYPER	
42 inches wide.....	HYRAX	

No. 1103. **“ARKWRIGHT”** Tracing Cloth. American made. Glazed on one side and dull on the other.

	Per roll of 24 yds. Code Word	Per yd.
30 inches wide.....	HYSA	
36 inches wide.....	HYSEN	
42 inches wide.....	HYTOP	

No. 1104. **“WHITE”** Tracing Cloth. Suitable for ink or pencil. Excellent transparency.

	Per roll of 24 yds. Code Word	Per yd.
30 inches wide.....	HYTRA	
36 inches wide.....	HYTREX	
42 inches wide.....	HYTRIP	

SEE PRICE LIST IN BACK OF CATALOG

TRACING CLOTHS IN SHEETS

Printed with borders and titles

			FEDERAL TELEGRAPH COMPANY PALO ALTO, CAL. U. S. A.			
					SCALE	DATE
					DRAWN	DRAWING NO.
					TRACED	
③						
②						
①						
REV.	ALTERATION	MADE BY				
		DATE				

The constantly increasing demand of the larger drawing rooms for standard sizes of tracing cloth and tracing paper sheets has induced us to cater to this requirement. We have executed any number of intricate jobs and our experiences are offered the profession with the assurance that highly satisfactory results will be had if this work is entrusted to us. Special non-smearing and absolutely opaque ink used.

We call attention to the illustration above. Note that the printed headings are absolutely in line with the horizontal rulings, also that the lines are unbroken and joined perfectly, an accomplishment unattainable unless executed in our special manner. Sheets printed on the under or reverse side, if desired, to allow for thorough erasing or cleaning without danger of destroying the printed matter.

Considering the time required for ruling borders and inserting corner titles and the saving of material, printed sheets are both efficient and economical. Let us quote you, regardless of size, quantity or intricacy of composition.

TRACING CLOTH REQUISITES



1106



1107

No. 1106. Pounce, or Tracing Cloth Powder, in shaker can. Each... **IBANA** Code Word

No. 1106 should be used for removing gloss from Tracing Cloth, which often prevents inks and water colors from adhering properly.

No. 1107. Inkwash. A superior article for removing waterproof ink from Tracing Cloth. In bottles of..... 4 oz. 1 oz.

SEE PRICE LIST IN BACK OF CATALOG

TRACING PAPERS IN ROLLS



TRANS-VEL PERFECT WHITE VELLUM

Trans-Vel is a superior white tracing vellum. It is dry treated therefore not greasy and will not pick up dirt and will take ink and pencil readily without the necessity of applying pounce. It is a paper of great strength and exceptional transparency. Will stand handling, is odorless and will not deteriorate with age. Trans-Vel No. 1117 Medium, is most transparent. No. 1118 Heavy, has good transparency and is noted particularly for its great strength.

and is noted particularly for its great strength.		Per roll of 20 yds.	Per yd.
No. 1117.	"TRANS-VEL" Medium.	Code Word	
	30 inches wide.....	IBEAL	
	36 inches wide.....	IBEER	
	42 inches wide.....	IBENT	
No. 1118.	"TRANS-VEL" Heavy.		
	30 inches wide.....	IBEON	
	36 inches wide.....	IBERO	
	42 inches wide.....	IBET	
No. 1120.	"VELLUM" Tracing Paper. An exceptionally strong tracing paper. Very transparent. Excellent for ink and water color work. Will not buckle nor become brittle with age. Put up in pasteboard tubes with metal ends.		
		Per roll of 20 yds.	Per yd.
		Code Word	
	30 inches wide.....	IBAR	
	36 inches wide.....	IBEX	
	42 inches wide.....	IBIS	
No. 1121.	"ALTURAS" Tracing Paper. A dull finish water-proof tracing paper of exceptional strength and transparency. Bluish tint. Excellent for ink or water color work.		
		Per roll of 20 yds.	Per yd.
		Code Word	
	36 inches wide.....	IBORE	
	42 inches wide.....	IBRATE	

PLUMAS, THE PERFECT TRACING PAPER

Plumas tracing paper is not a vellum but a natural parchment. It has a smooth surface, is very transparent and has great strength. It is absolutely odorless, suitable for pencil or ink work. No. 1123 Plumas Heavy will stand six or seven ink erasures and pencil lines will erase perfectly. These papers will stand unlimited handling and will not deteriorate with age.

		Per roll of 20 yds.	Per yd.
		Code Word	
No. 1122. "PLUMAS" Tracing Paper. Medium.	36 inches wide.....	ICING	
	42 inches wide.....	ICON	
No. 1123. "PLUMAS" Tracing Paper. Heavy.	36 inches wide.....	ICICLE	
	42 inches wide.....	ICTUS	

Send for our sample book of tracing papers.

SEE PRICE LIST IN BACK OF CATALOG

TRACING PAPERS IN ROLLS

No. 1124. "ORINDA" Tracing Paper. Unglazed surface. Very strong and transparent. Odorless and will not deteriorate. Will erase clean. Suitable for pencil or ink.

	Per roll of 20 yds. Code Word	Per yd.
36 inches wide.....	IDAUT	
42 inches wide.....	IDATE	

No. 1125N. "STOCKTON" Tracing Paper. A very thin but exceptionally strong white tracing paper. Unglazed surface, suitable for pencil and ink.

	Per roll of 20 yds. Code Word	Per yd.
36 inches wide.....	IDEB	
42 inches wide.....	IDECK	

No. 1126. "SIERRA" Tracing Paper, thin. A very transparent white paper, especially adapted for tracing from blue prints. Takes ink and pencil, and is very strong and durable.

	Per roll of 20 yds. Code Word	Per yd.
42 inches wide.....	IDEM	

No. 1127. "SIERRA" Tracing Paper, medium. Same as No. 1126, but heavier.

	Per roll of 20 yds. Code Word	Per yd.
42 inches wide.....	IDES	

No. 1128. "COLUSA" Tracing Paper. A white, highly transparent tracing paper. Unglazed surface. Suitable for pencil or ink.

	Per roll of 50 yds. Code Word	Per yd.
36 inches wide.....	IDENO	
42 inches wide.....	IDERN	

No. 1129. "SHASTA" Tracing Paper. A white paper, slightly glazed. Smooth surface, very transparent and of great strength. For ink or pencil work.

	Per roll of 20 yds. Code Word	Per yd.
42 inches wide.....	IDIO	

No. 1130. "AVALON" Tracing Paper. A thin, white, natural tracing paper, adapted for pencil and ink perspectives. Very strong.

	Per roll of 50 yds. Code Word	Per yd.
42 inches wide.....	IDOL	
57 inches wide.....	IDYL	

No. 1132. "EXPOSITION" Tracing Paper. A thin, strong paper for tracing full size details, adapted to pencil only.

	Per roll of 50 yds. Code Word	Per yd.
36 inches wide.....	ILEUM	
42 inches wide.....	ILEX	
48 inches wide.....	ILIAC	

Send for our sample book of tracing papers.

SEE PRICE LIST IN BACK OF CATALOG

TRACING PAPERS IN ROLLS

- No. 1133. **"MONTEREY" Tracing Paper.** A cream-colored thin tracing paper for pencil and crayon sketching.
- Per roll of 50 yds. Per yd.
Code Word
- 40 inches wide..... **ILOPE**
- No. 1134. **"VERNALIA" Tracing Paper.** An unglazed, white tracing paper of good strength and transparency.
- Per roll of 20 yds. Per yd.
Code Word
- 42 inches wide..... **ILIU**
- No. 1136. **"TALLAC" Tracing Paper.** A white, natural tracing paper. Has an excellent pencil surface. Very strong and thin.
- Per roll of 50 yds. Per yd.
Code Word
- 42 inches wide..... **IMMIGRANT**
- No. 1137. **"SONORA" Tracing and Sketching Paper, Medium.** A white paper, strong and tough, especially made for sketching and transferring. Stands erasing and takes pencil, ink and color well.
- Per roll of 50 yds. Per yd.
Code Word
- 36 inches wide..... **IMOLE**
42 inches wide..... **IMONACK**
- No. 1139. **"MADERA" Tracing and Sketching Paper, Medium.** A white paper, will take ink and color perfectly. Used for tracing and sketching, adaptable for blueprinting.
- Per roll of 50 yds. Per yd.
Code Word
- 36 inches wide..... **IMONY**
42 inches wide..... **IMOON**
60 inches wide..... **IMOPHY**
- No. 1140. **"MADERA" Tracing and Sketching Paper, Heavy.** Like No. 1139, but heavier, used for sketching and tracing.
- Per roll of 50 yds. Per yd.
Code Word
- 36 inches wide..... **IMOR**
42 inches wide..... **IMOREL**
- No. 1142. **"BEVERLY" Tracing and Sketching Paper, Medium.** A pure white. Natural Sketching Paper of great strength and transparency. Splendid pencil surface; will take ink or color and has excellent erasing qualities.
- Per roll of 50 yds. Per yd.
Code Word
- 36 inches wide..... **IMOTE**
42 inches wide..... **IMOUN**
- No. 1143. **"BEVERLY" Tracing and Sketching Paper, Heavy.** Like No. 1142 but heavier.
- Per roll of 50 yds. Per yd.
Code Word
- 36 inches wide..... **IMOW**
42 inches wide..... **IMOYN**
- No. 1144. **"REDONDO" Tracing Paper.** A strong white BOND Tracing Paper with rather smooth surface. Has excellent tearing and folding qualities and will stand much handling. Very good transparency. For ink or pencil drawings.
- Per roll of 50 yds. Per yd.
Code Word
- 36 inches wide..... **IMORICK**
42 inches wide..... **IMORING**
- No. 1145. **"YOSEMITE" Tracing Paper, Extra Thin.** Glazed, often referred to as glass paper. For use of the lithographer, etc.
- Per roll of 20 yds. Per yd.
Code Word
- 42 inches wide..... **IMOST**

TRACING PAPERS IN SHEETS

No. 1117S. "TRANS-VEL" Tracing Paper in sheets.

Per Ream Per 100
Code Word

24x36 inches **IMUCK**
18x24 inches **IMUDE**

No. 1118S. "TRANS-VEL" Tracing Paper in sheets.

Per Ream Per 100
Code Word

24x36 inches **IMUDIN**
18x24 inches **IMUDOR**

No. 1124S. "ORINDA" Tracing Paper in sheets.

Per Ream Per 100
Code Word

24x36 inches **IMUG**
18x24 inches **IMULL**

No. 1137S. "SONORA" Tracing Paper in sheets.

Per Ream Per 100
Code Word

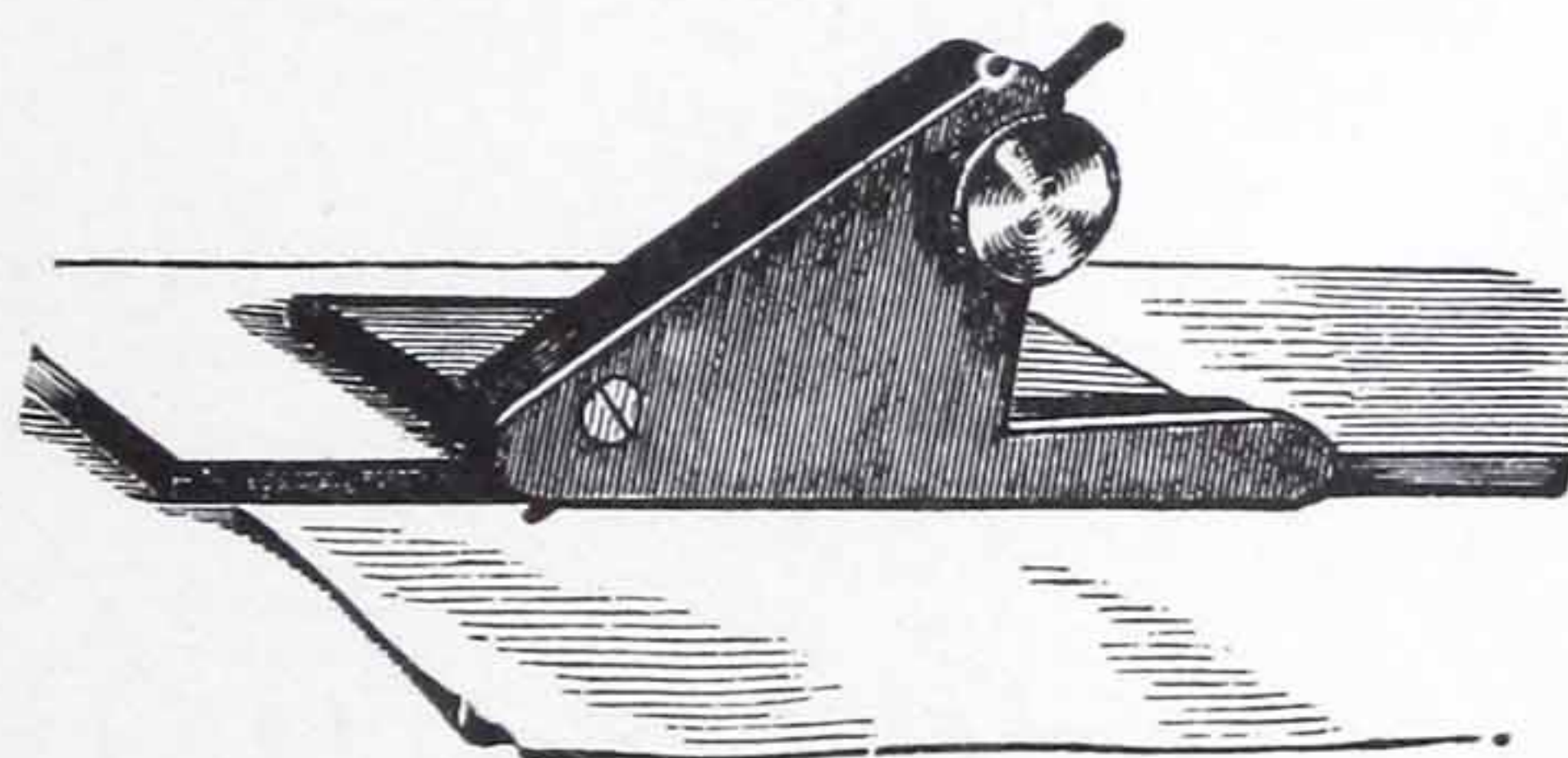
24x36 inches **IMNAP**
18x24 inches **IMNERT**

The above Tracing Papers are always carried in stock in sheet form. On special order we can supply any of our roll stock papers cut to sheets of any required size.

KNIVES FOR CUTTING PAPER AND CLOTH



No. 1149



No. 1150

No. 1149. Cutting Knife with adjustable blade..... **IMY**

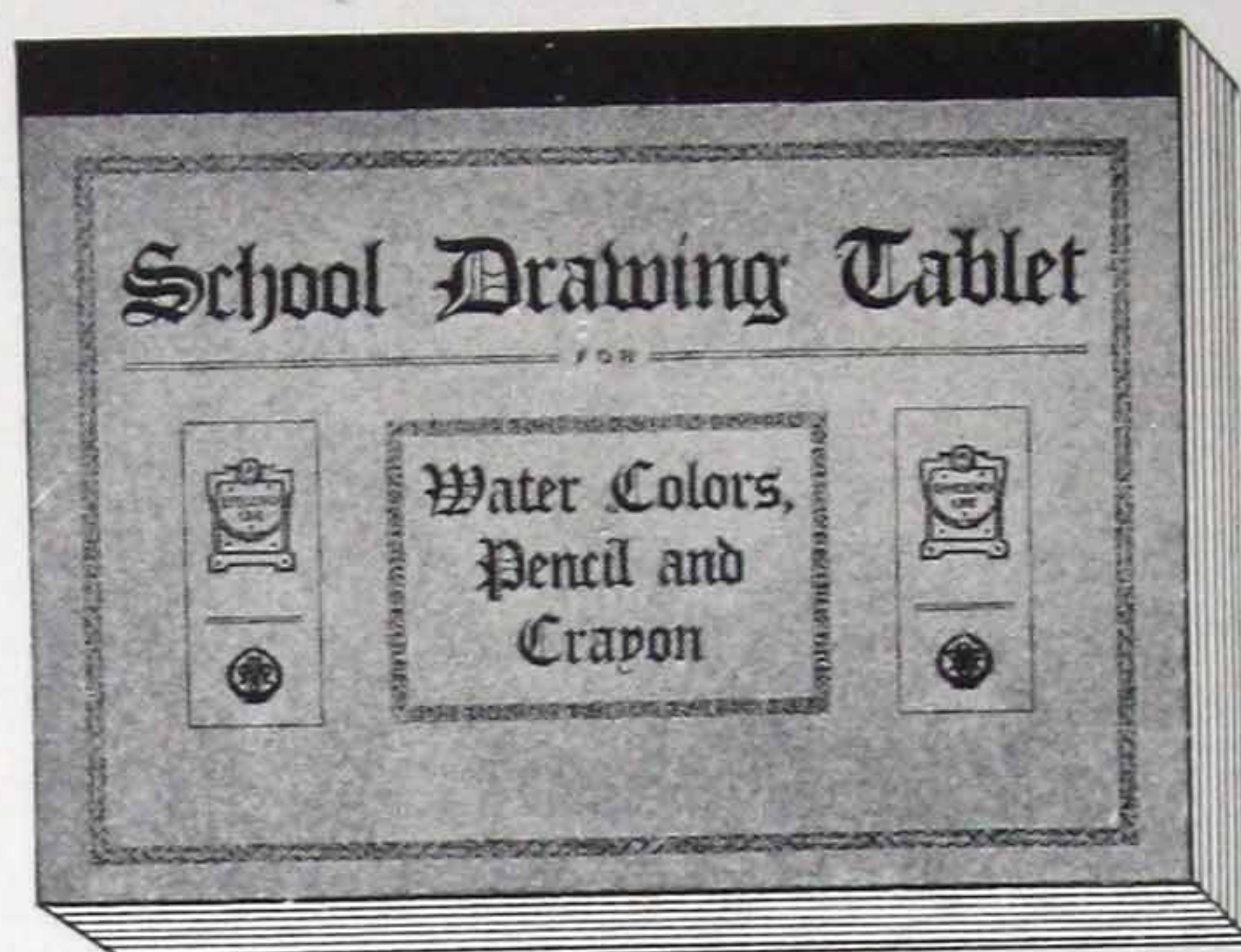
No. 1149A. Extra Blades for No. 1149 cutting knife..... **IMYR**

No. 1150. Handy Paper Cutter, nickel plated..... **IMYTH**

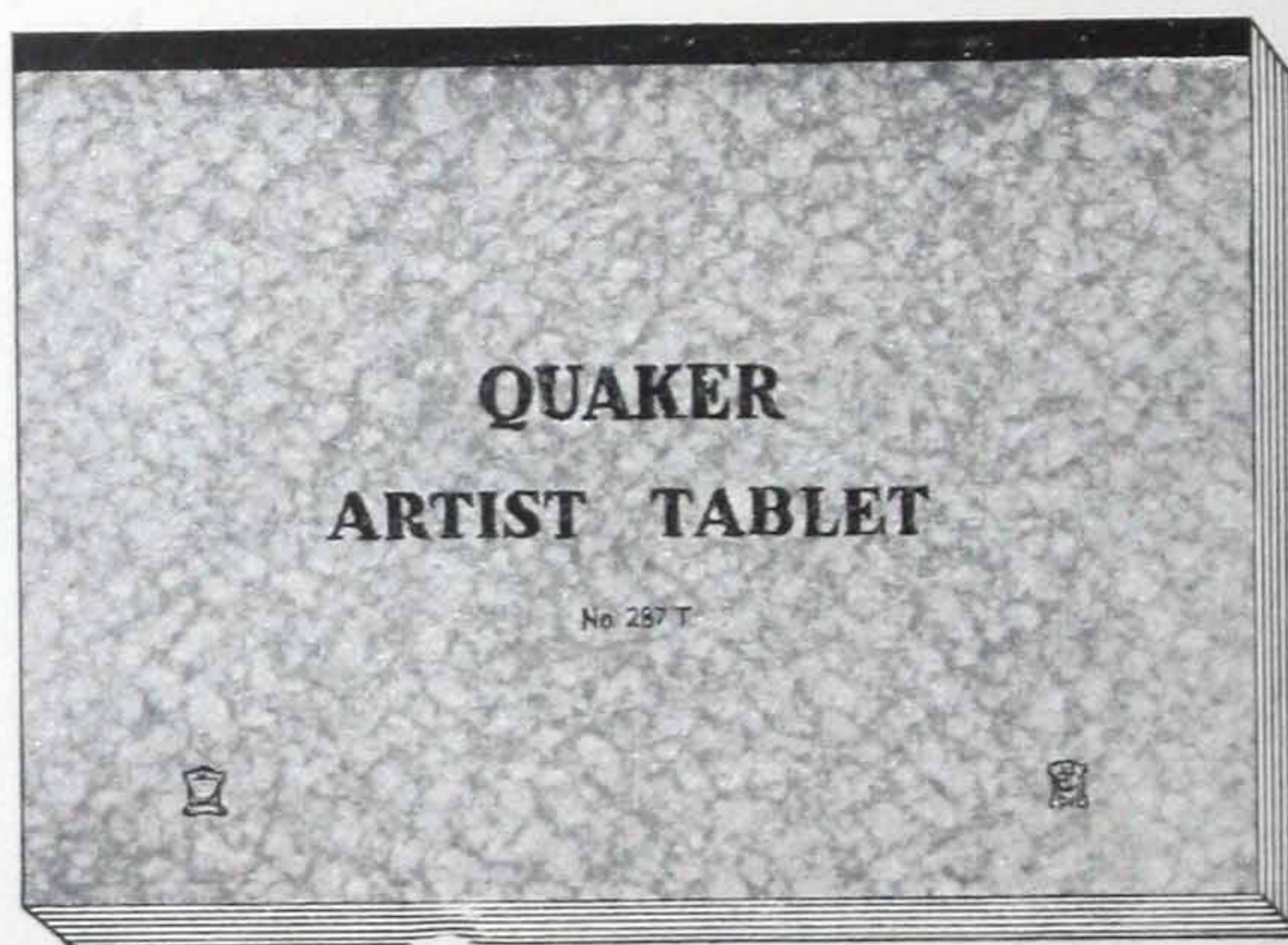
These tools are used for cutting drawings from the board, also for cutting any kind of paper or bristol board. They can be slid along T-square or straight-edge without injuring its edge, and have a thumbscrew adjustment which may be set so as to cut only the thickness of the paper, without marking the drawing board.

SEE PRICE LIST IN BACK OF CATALOG

DRAWING BOOKS AND TABLETS



- No. 1156.** School Drawing Tablets, for Water Color, Crayon and Pencil, 20 Sheets, 9x12 inches..... **IMZACK** Code Word
- No. 1157A.** School Drawing Pad, 12x18 inches, White Paper..... **IMZADE**
- No. 1157B.** School Drawing Pad, 12x18 inches, Manila Paper.... **IMZAG**
- These pads are suitable for Water Color, Crayon or Pencil.



- No. 1158A.** Artist Tablet, very fine quality white drawing paper, 40 sheets, 9x12 inches..... **IMZELL** Code Word
- No. 1158B.** Same as No. 1158A but size 10x14 inches..... **IMZEN**

SEE PRICE LIST IN BACK OF CATALOG

BLUE PRINT PAPERS

We use only the purest chemicals and guarantee every yard.

Your attention is directed to the various printing speeds with which we prepare our papers. When ordering kindly state which of the following solutions is desired:

Regular—This is for slow printing. Time of exposure about 4 minutes in bright sunlight. Keeps fresh for months.

Rapid—Time of exposure about 1 to 1½ minutes in bright sunlight. Next to regular printing gives best contrast.

Extra Rapid—Time of exposure about 30 to 40 seconds in bright sunlight. For use in cloudy weather and electric blueprinters.

Special Electric Rapid—Time of exposure about 20 to 30 seconds in bright sunlight. Especially prepared for use in electric blueprint machines.

Double Electric Rapid—Time of exposure about 10 to 20 seconds in bright sunlight. The fastest and most sensitive paper made. Especially suited in electric blueprint machines using mercury vapor lamps.



No. 1180. "APOLLO" Blue Print Paper, Medium Thick. A good strong paper, in the bath and out, for general printing. Rich blue tone, will wash pure white.

Inches wide—		30	36	42
Per roll of 10 yards.....	Code Word	INA	INCA	INDIA
Per roll of 50 yards.....	" "	INDO	INEX	INFER

No. 1181. "STEORRA" Blue Print Paper, Thin. This paper is especially adapted for mailing purposes.

Inches wide—		30	36	42
Per roll of 10 yards.....	Code Word	INFANT	INFIX	INGA
Per roll of 50 yards.....	" "	INGAL	INGOT	INLET

No. 1182. "VELVET" Blue Print Paper, Medium Thick. A first-class paper. Will withstand much handling, and serve well as records.

Inches wide—		30	36	42
Per roll of 10 yards.....	Code Word	IODIC	IONE	IOWA
Per roll of 50 yards.....	" "	IODINE	IOTA	INYO

No. 1183. "PARAMOUNT" Blue Print Paper, Medium Thick. Finest quality, especially well adapted for blue line work.

Inches wide—		30	36	42	54
Per roll of 10 yards.....	Code Word	IRA	IRAB	IRACK	IRADE
Per roll of 50 yards.....	" "	IRAN	IRIS	IRISH	IRONE

Samples of any of our papers will be mailed upon application.

SEE PRICE LIST IN BACK OF CATALOG

BLUE PRINT PAPERS

When ordering kindly state which solution is wanted. See heading page 199.

No. 1184. "PARCHMENT" Blue Print Paper, Thin. The best and strongest paper made, very tough and durable. Will stand much handling and is ideal for permanent record filing.

Inches wide—		24	30	36	42	54
Per roll of 10 yards...	Code Word	ISAAC	ISAR	ISEN	ISELL	ISLET
Per roll of 50 yards...	" "	ISAGON	ISLAND	ISOR	ISPA	ISTO

No. 1185. "PARCHMENT" Blue Print Paper, Medium Thick. Same quality as No. 1184, but heavier.

Inches wide—		30	36	42
Per roll of 10 yards.....	Code Word	ITALIC	ITALY	ITAL
Per roll of 50 yards.....	" "	ITA	ITABOR	ITAZ

No. 1186. "WAWONA" Special Blue Line Paper, Medium Thick.

Inches wide—		30	36	42	54
Per roll of 10 yards.....	Code Word	ITAT	ITEM	ITIR	ITIST
Per roll of 50 yards.....	" "	ITOL	ITUX	ITSEL	ITSOR

BLUE PRINT CLOTHS

No. 1190. "PARAMOUNT" Blue Print Cloth, Medium.

Inches wide—		30	36	42	54
Per roll of 10 yards.....	Code Word	JAB	JABBER	JABBIN	JABSO
Per roll of 50 yards.....	" "	JACK	JACKER	JACKY	JACKSON

No. 1191. "PARAMOUNT" Blue Print Cloth, Thin.

Inches wide—		30	36	42
Per roll of 10 yards.....	Code Word	JADE	JADOR	JADUM
Per roll of 50 yards.....	" "	JAG	JAM	JAR

In ordering kindly state which solution is wanted.

BLUE PRINT INTENSIFIER

For developing overexposed prints and treatment of blue line prints to intensify the blue and to clarify the white background. In crystal form.

No. 1193. Blue Print Intensifier. Per pound.....
Code Word
JARGON

SEE PRICE LIST IN BACK OF CATALOG

BROWN PRINT PAPERS AND CLOTHS

For Negative and Positive Printing

Sufficient developing salt furnished with each roll.

No. 1195. Brown Print Paper, Medium Thick. For positive prints.

Inches wide—	30	36	42	54
Per roll of 10 yards....Code Word	JASMINE	JASPER	JASPO	JATO
Per roll of 50 yards.... " "	JAMY	JAKE	JAGER	JAPPY

No. 1196. Brown Print Paper, Thin. For Negative Prints.

Inches wide—	30	36	42	54
Per roll of 10 yards....Code Word	JIBE	JIM	JOAN	JORE
Per roll of 50 yards.... " "	JOHN	JOE	JOLLY	JORY

No. 1197. Brown Print Cloth, Medium Thick. For Positive Prints.

Inches wide—	30	36	42	54
Per roll of 10 yards....Code Word	KABAR	KABLE	KABIN	KABRY

No. 1198. Brown Print Cloth, Thin. For Negative Prints.

Inches wide—	30	36	42
Per roll of 10 yards.....Code Word	KABO	KABY	KABDO

FIXING SALT

For intensifying and fixing brown prints.

No. 1200. 2-ounce can.....	Code Word KABWIN
No. 1202. 1-pound can.....	KABWOL



No. 1207

TRANSPARENTIZING FLUID

For treating negatives to allow faster printing, or making regular drawings transparent for printing.

No. 1205. 1-quart can.....	Code Word KACKEL
No. 1207. 1-gallon can.....	KACY

OPAQUES

For correcting mistakes and faults in negatives

No. 1208. (Old No. 1225) Liquid Opaque; per 1-ounce bottle.....**KAEGIN**

SEE PRICE LIST IN BACK OF CATALOG

DIRECT BLACK LINE PAPERS AND CLOTHS

The Tioga Direct Black Line Papers and Cloths will produce perfect black line prints on a white background. The paper is exposed in the same manner in which blue prints are made. No negative is required. The exposed prints are developed by applying a thin film of developing solution to the exposed surface of the paper. No further washing or drying is required. The developing solution may be applied by hand with a damp sponge or cotton.

- No. 1210.

TIOGA DIRECT BLACK LINE PAPER, Medium weight.
- | | | | | |
|------------------------------------|-------|--------|--------|--------|
| Inches wide— | 30 | 36 | 42 | 54 |
| Per roll of 10 yards.....Code Word | KADER | KADEST | KADETA | KADEW |
| Per roll of 50 yards.....Code Word | KADIA | KADIDE | KADIFF | KADIKE |
- No. 1211.

TIOGA DIRECT BLACK LINE PAPER, Thin.
- | | | | | |
|---------------------------------|--------|--------|--------|--------|
| Inches wide— | 30 | 36 | 42 | 54 |
| Per roll of 10 yards..Code Word | KADOB | KADOCK | KADOG | KADOKE |
| Per roll of 50 yards..Code Word | KADUCK | KADUDE | KADULF | KADUNN |
- No. 1214.

TIOGA DIRECT BLACK LINE CLOTH, Medium.
- | | | | |
|------------------------------------|---------|---------|---------|
| Inches wide— | 30 | 36 | 42 |
| Per roll of 10 yards.....Code Word | KADWACK | KADWADE | KADWAG |
| Per roll of 50 yards.....Code Word | KADWAIN | KADWALL | KADWANT |
- No. 1216.

TIOGA DIRECT BLACK LINE CLOTH, Thin.
- | | | | |
|------------------------------------|---------|---------|--------|
| Inches wide— | 30 | 36 | 42 |
| Per roll of 10 yards.....Code Word | KADWARD | KADWASH | KADWAX |
| Per roll of 50 yards.....Code Word | KADWEN | KADWEST | KADWEY |

TIOGA DEVELOPING SALTS

Directions for mixing are given on the label.

- No. 1212.

TIOGA BLACK LINE DEVELOPER, can containing two powders sufficient to make one-half gallon of developing fluid—enough for 150 yards.Code Word,
- No. 1212½.

TIOGA BLACK LINE DEVELOPER, can containing two powders sufficient to make one quart of developing solution.Code Word,

ERASING FLUIDS



For making alterations on Blue Prints or Negatives

- | | | |
|-----------|---|-----------|
| | | Code Word |
| No. 1220. | White, for Blue Prints; per bottle..... | KAEB |
| No. 1221. | Red, for Blue Prints; per bottle..... | KAECK |
| No. 1222. | Yellow, for Blue Prints; per bottle..... | KAEDY |
| No. 1223. | White, for Negative Prints; per bottle..... | KAEFO |

SEE PRICE LIST IN BACK OF CATALOG



DIRECT POSITIVE PRINT PAPERS AND CLOTHS

The Ozalid process and sensitized materials provide a variety of results not available in any other direct printing process. There are four standard emulsions which produce black, blue, maroon or sepia lines on white paper, transparent tracing paper, tracing cloth and opaque cloth. The development is dry by means of aqua-ammonia vapor and all prints are true to scale of the original. The Ozalid process not only provides a simple economical method of producing positive prints having overcome all the shortcomings of the earlier direct printing processes but Ozalid positive prints are made more quickly than the old-fashioned negative blue prints.

OZALID PAPERS

Inches wide			30	36	42	54
		Weight	Color of Line	Code Word	Code Word	Code Word
No. 1019.		Medium	Black			
Per roll of 10 yds.....			OZA	OZAB	OZABY	OZADE
Per roll of 50 yds.....			OZAFF	OZAG	OZAGA	OZAGER
No. 1024.		Heavy	Black			
Per roll of 10 yds.....			OZAGI	OZAGLA	OZAGNE	OZAGMI
Per roll of 50 yds.....			OZAGO	OZAGOB	OZAGOG	OZAGOL
No. 2119.		Medium	Blue			
Per roll of 10 yds.....			OZAK	OZAKA	OZAKE	OZAKER
Per roll of 50 yds.....			OZAKI	OZAKIB	OZAKIDE	OZAKIFF
No. 2124.		Heavy	Blue			
Per roll of 10 yds.....			OZAL	OZALA	OZALAD	OZALAGE
Per roll of 50 yds.....			OZALE	OZALEB	OZALECK	OZALED
No. 3019.		Medium	Maroon			
Per roll of 10 yds.....			OZALUB	OZALU	OZALUCK	OZALUDE
Per roll of 50 yds.....			OZALUFT	OZALUG	OZALUM	OZALUND
No. 3024		Heavy	Maroon			
Per roll of 10 yds.....			OZAM	OZAMA	OZAMAT	OZAMAX
Per roll of 50 yds.....			OZANY	OZANET	OZANIB	OZANOP
No. 4114.		Extra Thin	Sepia			
Per roll of 10 yds.....			OZAPH	OZAPIN	OZAPLA	OZAPLER
Per roll of 50 yds.....			OZAPO	OZAPOD	OZAPOLL	OZAPONE

OZALID CLOTHS

No. 1400.		Heavy	Black			
Per roll of 10 yds.....			OZAR	OZARA	OZARD	OZAREN
Per roll of 50 yds.....			OZARI	OZARID	OZARIFF	OZARIKE
No. 1444.		Thin	Black			
Per roll of 10 yds.....			OZARO	OZAROD	OZAROG	OZAROK
Per roll of 50 yds.....			OZARU	OZARUF	OZARULE	OZARUN

OZALID TRACING CLOTH

No. 4300.		Extra Thin	Sepia			
Per roll of 10 yds.....			OZASA	OZASE	OZASH	OZASHEN
Per roll of 20 yds.....			OZASIN	OZASIT	OZASIVE	OZASIX

Ozalid paper and cloths can also be furnished in flat sheets of all standard sizes. Quotations furnished on request.

SEE PRICE LIST IN BACK OF CATALOG



PROCESS PRINTING & MAP MOUNTING



We have every facility for the prompt duplicating of drawings and tracings. Work entrusted to us will receive most careful attention.

BLUE PRINTS—White lines on blue background. Made on light, medium or heavy paper or on cloth.

BLUE LINE PRINTS—Blue lines on a white background. Made on paper or cloth same as blue prints.

BROWN PRINTS OR NEGATIVES—White lines on dark brown backgrounds. Made on thin paper for use as negatives for making positive brown line or blue line prints.

BROWN LINE PRINTS—Brown lines on white background. Made from negatives on medium and thin papers or on cloth.

OZALID PRINTS—Black, blue or maroon lines on creamy white background. On thin, medium or heavy paper or cloth.

BLACK LINE PRINTS—Black lines on white background made directly from tracings.

LITHOPRINTS—Exact reproduction of original tracings on tracing cloth, drawing cloth or papers of any desired thickness. Sections of maps may be joined and lithoprinted as one and parts may be blocked out and new work added. A dry process and all shrinkage is eliminated.

PHOTOSTAT NEGATIVE PRINTS—White lines on black background. Made on medium weight photographic paper.

PHOTOSTAT POSITIVE PRINTS—Black lines on white background. Made from photostat negatives, or other negatives.

Samples and prices on any of the above processes will be gladly furnished on request.

MOUNTING SERVICE

Mounting on cloth single sheets.....	sq. ft.
Mounting on cloth matched sheets.....	sq. ft.
Mounting on cloth cut to fold.....	sq. ft.
Mounting Geological sheets to fold.....	each
Mounting Geological sheets, cloth.....	each
Mounting on Beaver Board.....	sq. ft.
Common sticks.....	lin. ft.
Half round sticks.....	lin. ft.

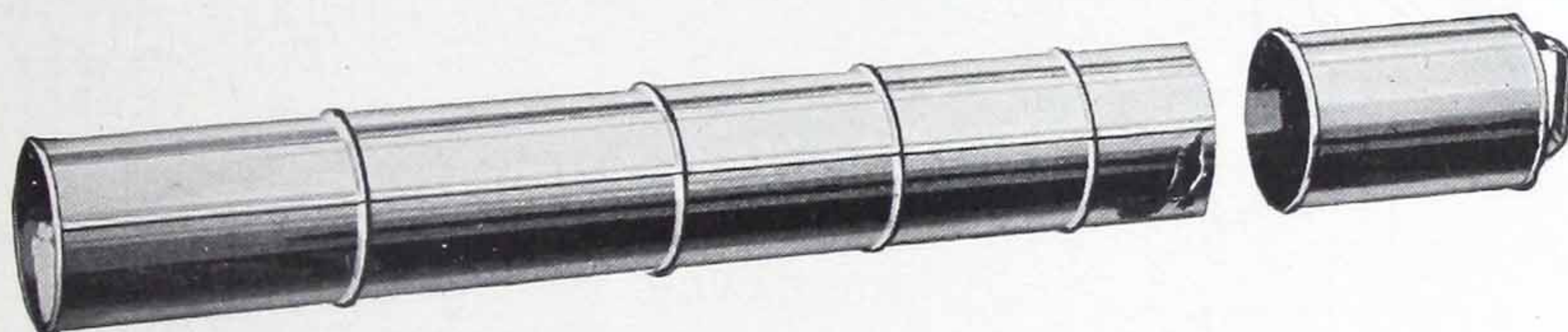
SEE PRICE LIST IN BACK OF CATALOG

UNPREPARED BLUE PRINT PAPER AND CLOTHS

Admirably adapted for use as drawing papers or cloths. Each paper is a specially selected stock, the best in its particular class. We especially recommend our Nos. 1184U and 1185U "PARCHMENT" Papers, which are excellent for pencil, ink or water color work. Nos. 1190U and 1191U "PARAMOUNT" Cloths will also take ink or water color.

No. 1180U. "APOLLO," medium thick, unprepared.				
Inches wide—	30	36	42	
Per 50-yard roll.....				
No. 1181U. "STEORRA," thin, unprepared.				
Inches wide—	30	36	42	
Per 50-yard roll.....				
No. 1184U. "PARCHMENT," thin, unprepared.				
Inches wide—	30	36	42	54
Per 50-yard roll.....				
No. 1185U. "PARCHMENT," medium thick, unprepared.				
Inches wide—	30	36	42	
Per 50-yard roll.....				
No. 1190U. "PARAMOUNT" Cloth, medium thick, unprepared.				
Inches wide—	30	36	42	54
Per 10-yard roll.....				
No. 1191U. "PARAMOUNT" Cloth, thin, unprepared.				
Inches wide—	30	36	42	
Per 10-yard roll.....				

MAILING AND STORAGE TUBES



Made of tin for storing prepared papers and cloths, excluding light and moisture.

	Inches long—	31	37	43	55
No. 1230.	For 10-yard rolls (2-in. diameter) ea..	KAEL	KAEM	KAENO	KANEY
No. 1231.	For 50-yard rolls (4-in. diameter) ea..	KAER	KAEST	KAETY	KAEYE

HEAVY CARDBOARD TUBES

Made of stout pasteboard, with screw metal ends.

	Inches long—	32	37	43
No. 1232.	2 $\frac{3}{4}$ -in. diameter; ea.....			

Telescoping, made of plain strawboard.

	Inches long—	12	18	24	36	42	48
No. 1237.	2- in. diam.; ea.....						

Open ends, plain strawboard, spiral.

	Inches long—	12	18	24	30	36	42
No. 1241.	1 $\frac{1}{2}$ -in. diam.; ea.....						
No. 1242.	2- in. diam.; ea.....						

SEE PRICE LIST IN BACK OF CATALOG

LIETZ BLUE PRINT FRAMES

Our Blue Print Frames are made of well seasoned oak, and are of the best workmanship. Finished in three-coat Golden Oak and black backs. Equipped with oil-tempered steel springs and special bar catches which are rapidly operated without bruising the fingers.



	Clear Printing Surface	Frame Only	Frame with Felt Pad	Frame and Pad and Polished Plate Glass Code Word
No. 1265A.	20x24			KAFAL
No. 1265B.	24x36			KAFERT
No. 1265C.	30x42			KAFIN
No. 1265D.	36x48			KAFOR
No. 1265E.	36x60			KAFORTH
No. 1265F.	42x60			KAFLY
No. 1265G.	42x72			KAFU

All prices cover crating for shipment.
Shipping weight, about 10 lbs. per square foot.

INSURANCE

We insure plate glass against breakage when requested to do so.
We are not responsible for breakage of glass in transit.

EXTRA PADS FOR BLUE PRINT FRAMES

Felt Pads 3/8-inch thick

No. 1266A.	20x26 in.	.....
No. 1266B.	24x30 in.	.....
No. 1266C.	30x42 in.	.....
No. 1266D.	36x48 in.	.....
No. 1266E.	36x60 in.	.....
No. 1266F.	42x60 in.	.....
No. 1266G.	42x72 in.	.....

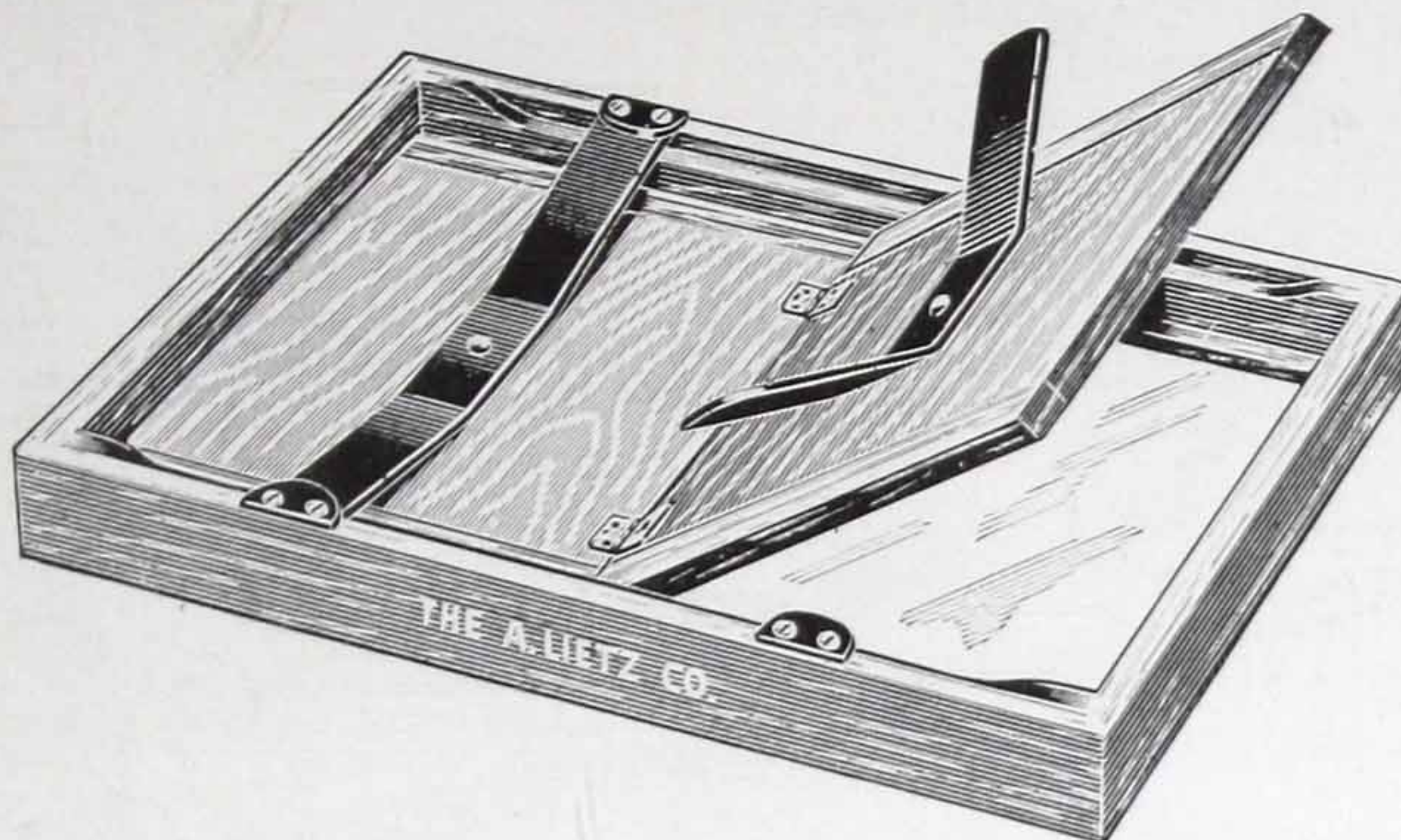
Cotton Pads 3/8-inch thick

No. 1267A.	20x26 in.	.....
No. 1267B.	24x30 in.	.....
No. 1267C.	30x42 in.	.....
No. 1267D.	36x48 in.	.....
No. 1267E.	36x60 in.	.....
No. 1267F.	42x60 in.	.....
No. 1267G.	42x72 in.	.....

SEE PRICE LIST IN BACK OF CATALOG

SMALL BLUE PRINT FRAMES

Made of well seasoned hardwood, locked corners, shellac finish. With oil-tempered steel springs, spring brass catches. A strong, light frame which can be easily handled.



No. 1271

Clear Printing
Surface

Frame Complete with Felt Pad
and Double Thick Glass
Code Word

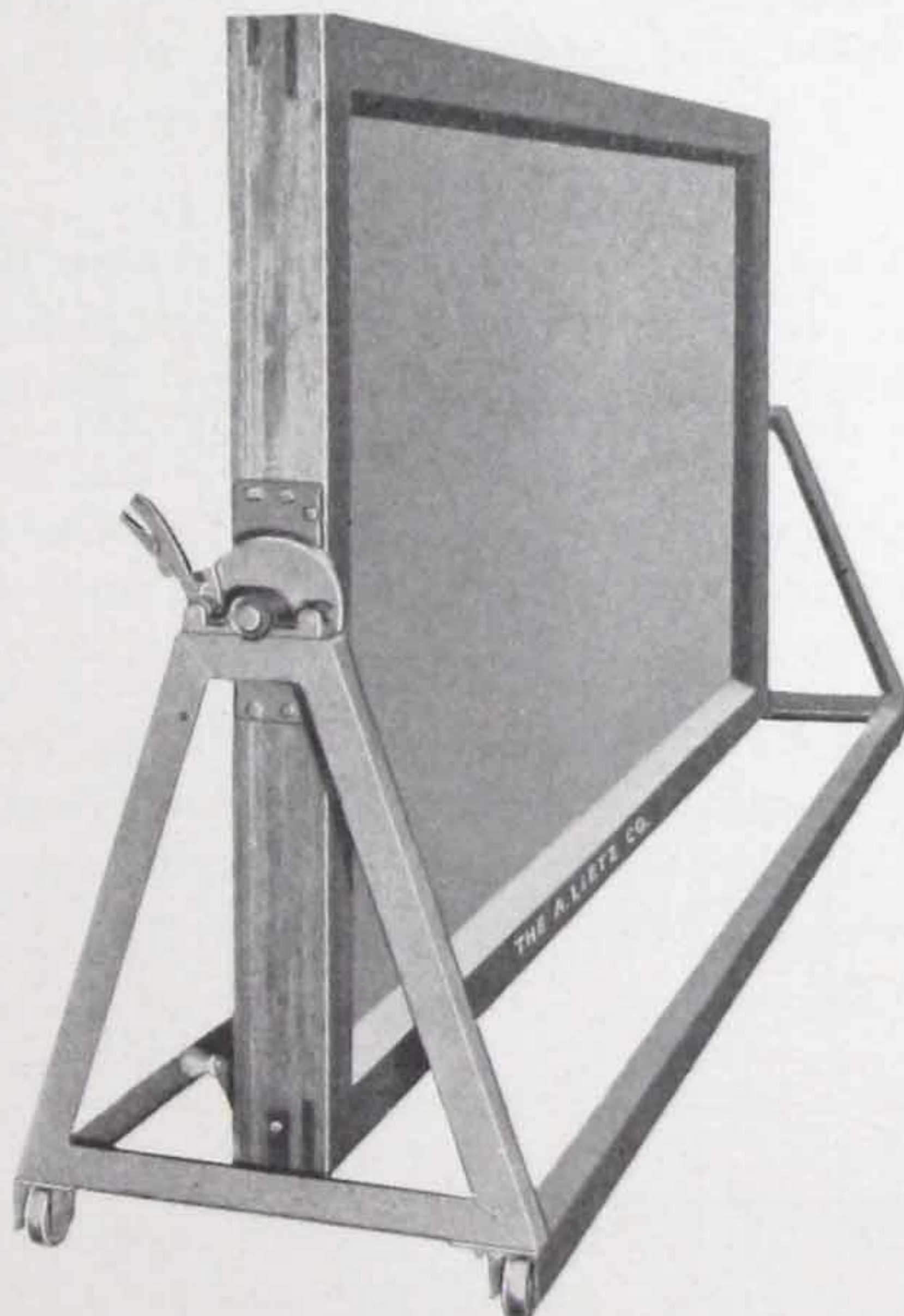
No. 1271A.
No. 1271B.

12x16
16x21

KAFEE
KAFOOT

All prices cover crating for shipment.
Shipping weight, about 10 lbs. per square foot.
We are not responsible for breakage of glass in transit.

BLUE PRINT CARS



These cars may be used with or without tracks and carry the largest frame with ease. Constructed of strong angle iron with baked enamel finish. The frame will revolve in a complete circle. The Lietz improved brake mechanism permits locking frame positively in any position. When ordering car only, state outside dimensions of frame. Also state whether for use on track.

	Approximate Shipping Wt.	Price Car only Code Word
No. 1275A. Car for frames up to and including 30x42 in.	140 lbs.	KAFREY
No. 1275B. Car for frames up to and including 42x72 in.	150 lbs.	KAFTO
No. 1275C. Car for frames up to and including 48x100 in.	160 lbs.	KAFTIRE

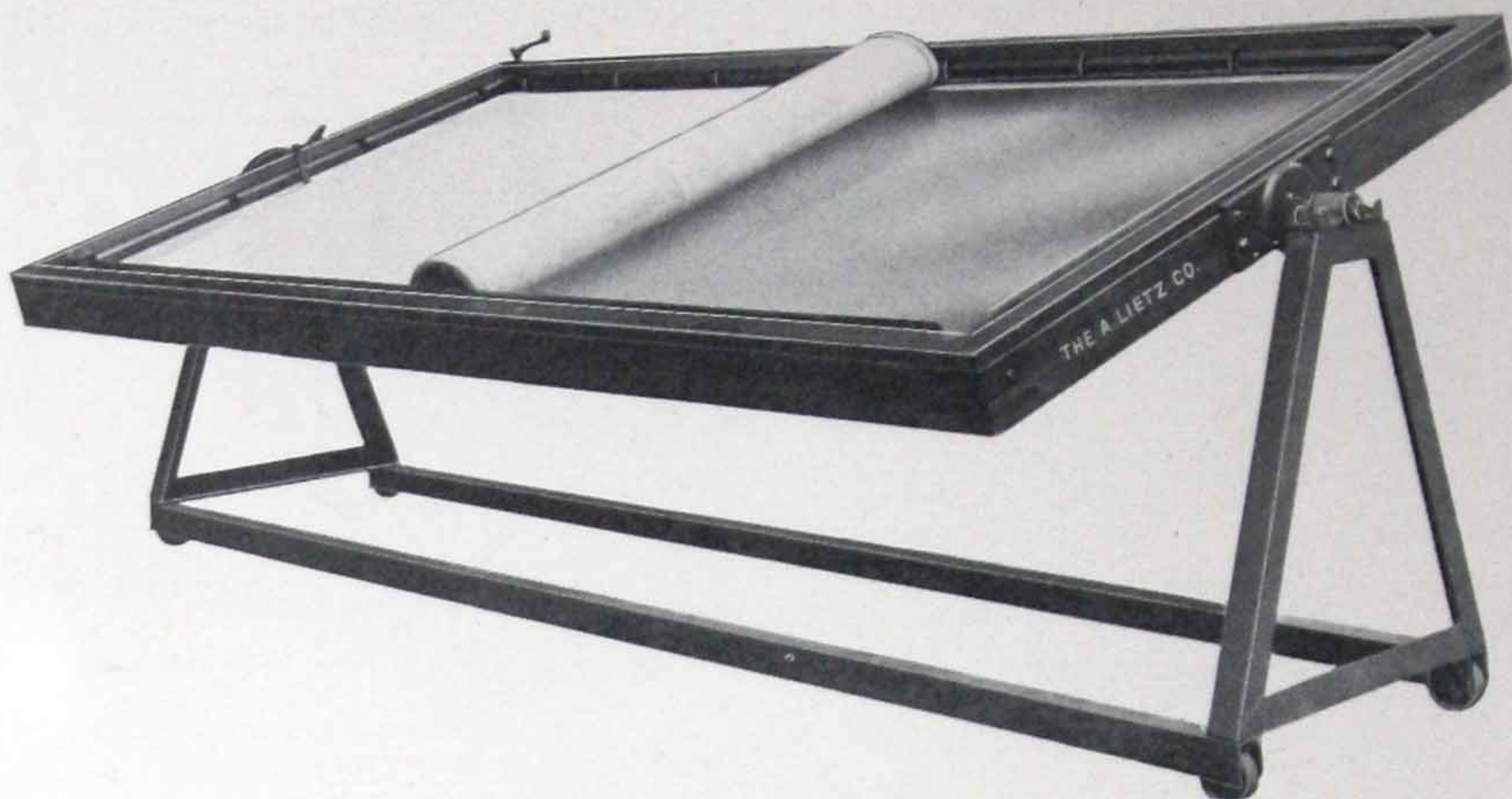
IMPORTANT

When ordering blue print car and track please state height and width of your window or door when open, width of window sill, height of window sill from floor, and thickness of wall. Also state size of your blue print frame when not ordering new frame.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ SINGLE CONTROL VACUUM PRINT FRAME

Improved patented mechanical movements.



The Lietz Single Control Vacuum Frame is of the latest improved design. All clamping bars open and close simultaneously. The control mechanism is easily operated and highly efficient. Adapted for both electric and sunlight exposure, its quick, simple operation speeds production and facilitates greatly the handling of work.

These frames are manufactured in our own factory. They are constructed of laminated hardwood with overlapping and interlocking corners. They are extremely rigid and entirely without twist, even in the larger sizes. This rigidity, with the resilient power application, is a very important item to consider—especially in the larger frames as it prevents glass breakage.

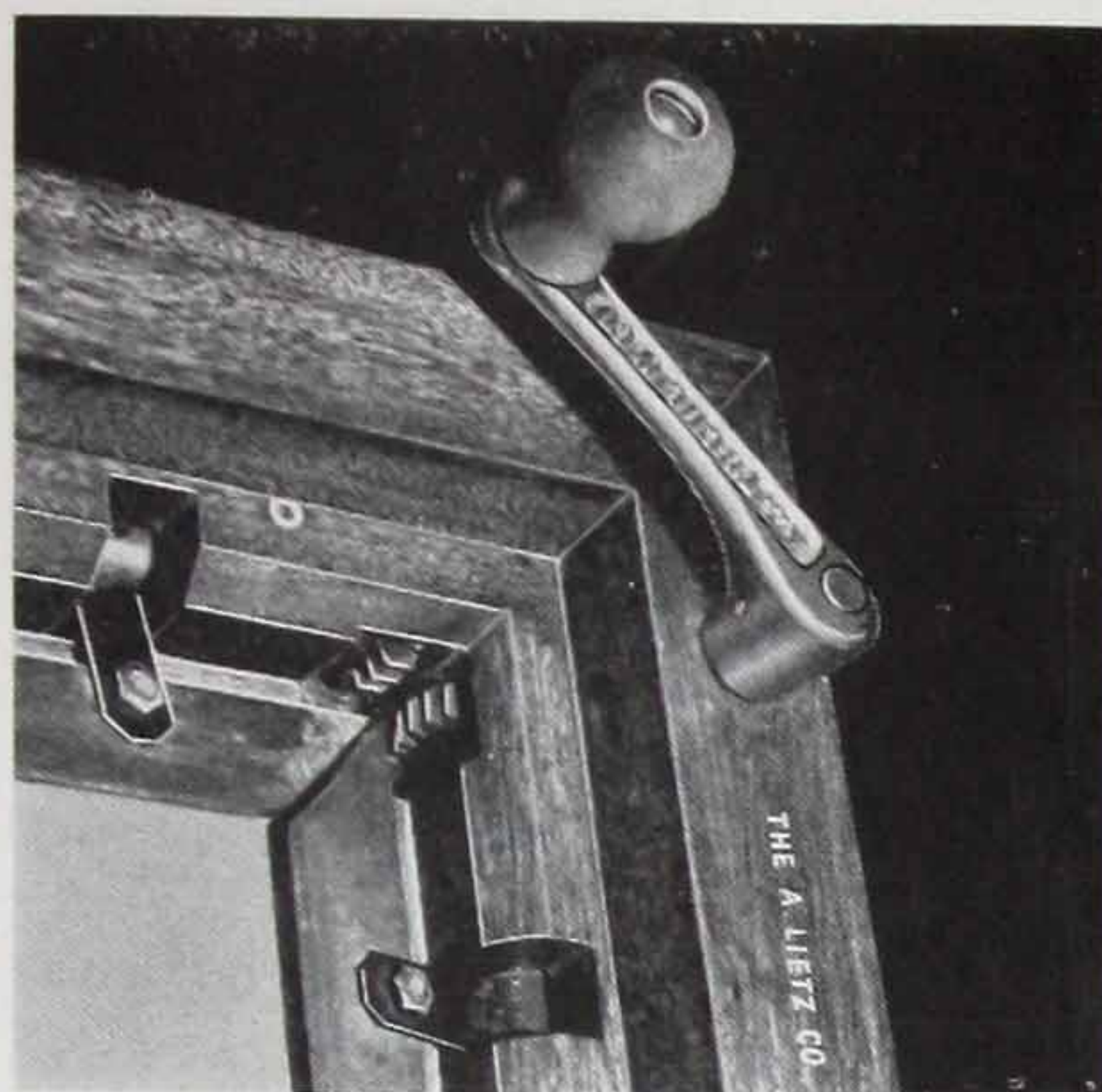
Through patented, correctly designed mechanical movements, equally distributed pressure is applied to the clamping bars giving maximum vacuum efficiency. All rotating shafts and spindles are mounted in sleeves and ball bearings and are entirely enclosed.

Vacuum contact is obtained by means of a vacuum pump connected by hose to a specially designed rubber pad having pliable rubber beading with molded corners (not mitred cemented corners).

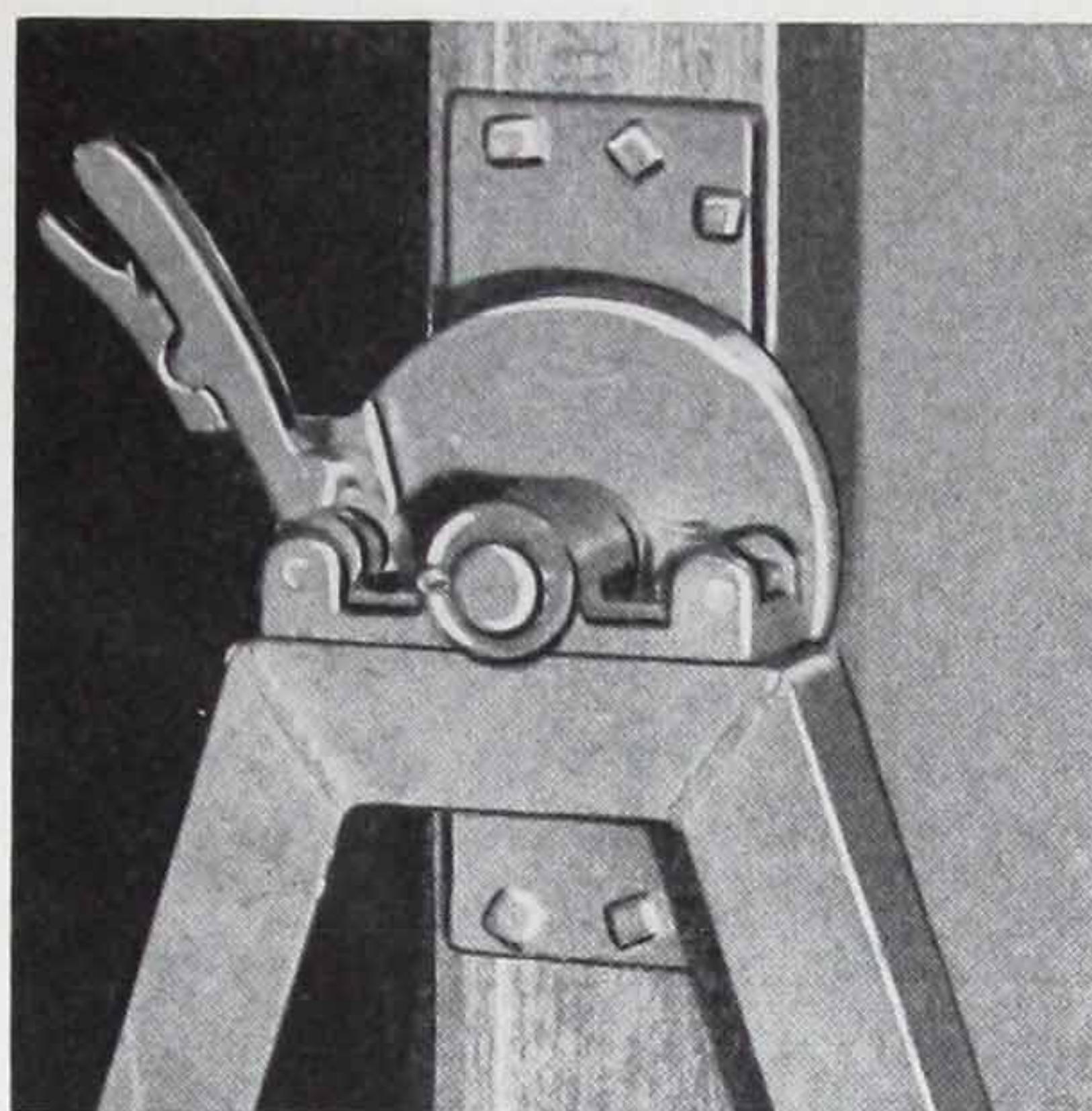
These frames are made to be used in conjunction with our portable carriage and track for sunlight exposure or may be mounted on stationary standards for arc lamp or artificial light exposure. With either equipment, the frame rotates through a complete circle. The Lietz improved brake mechanism permits locking positively and quickly in any position.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ SINGLE CONTROL VACUUM PRINT FRAME



Illustrating Lietz single control clamping arrangement.



Illustrating Lietz improved brake control mechanism.

Lietz Single Control Vacuum Print Frame WITHOUT CARRIAGE

	Printing Surface	Frame only Code Word	Frame with Rubber Blanket and Hose Code Word
No. 1276A.	44x74	KAGA	KAGAB
No. 1276B.	56x86	KAGACK	KAGACY
No. 1276C.	56x100	KAGADE	KAGADIE
No. 1276D.	56x122	KAGADIFF	KAGADINT
No. 1276E.	56x146	KAGADISH	KAGADITA
No. 1276F.	56x158	KAGADIX	KAGADIZE

Lietz Single Control Vacuum Print Frame WITH CARRIAGE

	Printing Surface	Frame only Code Word	Frame with Rubber Blanket and Hose Code Word
No. 1277A.	44x74	KAGADO	KAGADOCK
No. 1277B.	56x86	KAGADOFT	KAGADOG
No. 1277C.	56x100	KAGADOHL	KAGADOKE
No. 1277D.	56x122	KAGADOLL	KAGADOM
No. 1277E.	56x146	KAGADOOR	KAGADORT
No. 1277F.	56x158	KAGADOSS	KAGADOWN

PLATE GLASS FOR VACUUM PRINT FRAMES

We will furnish polished Plate Glass for the above frames at regular market prices but recommend that, due to the cost of packing, shipping and insurance, this be purchased locally.

VACUUM OUTFIT

For use with Lietz Single Control Vacuum Print Frames

The Lietz Vacuum pump is of the Rotary type direct connected to a motor, mounted on baseboard with snap switch for either direct or remote control. Rotary pumps are known for their efficient and noiseless operation. There are very few moving parts and if properly lubricated will last indefinitely.

No. 1278A. Vacuum Outfit, consisting of Rotary type pump direct connected to $\frac{1}{4}$ H.P. 110 volt 50 or 60 cycle A. C. current motor, mounted on baseboard with snap switch, for frames having a printing surface 44x74 or less.

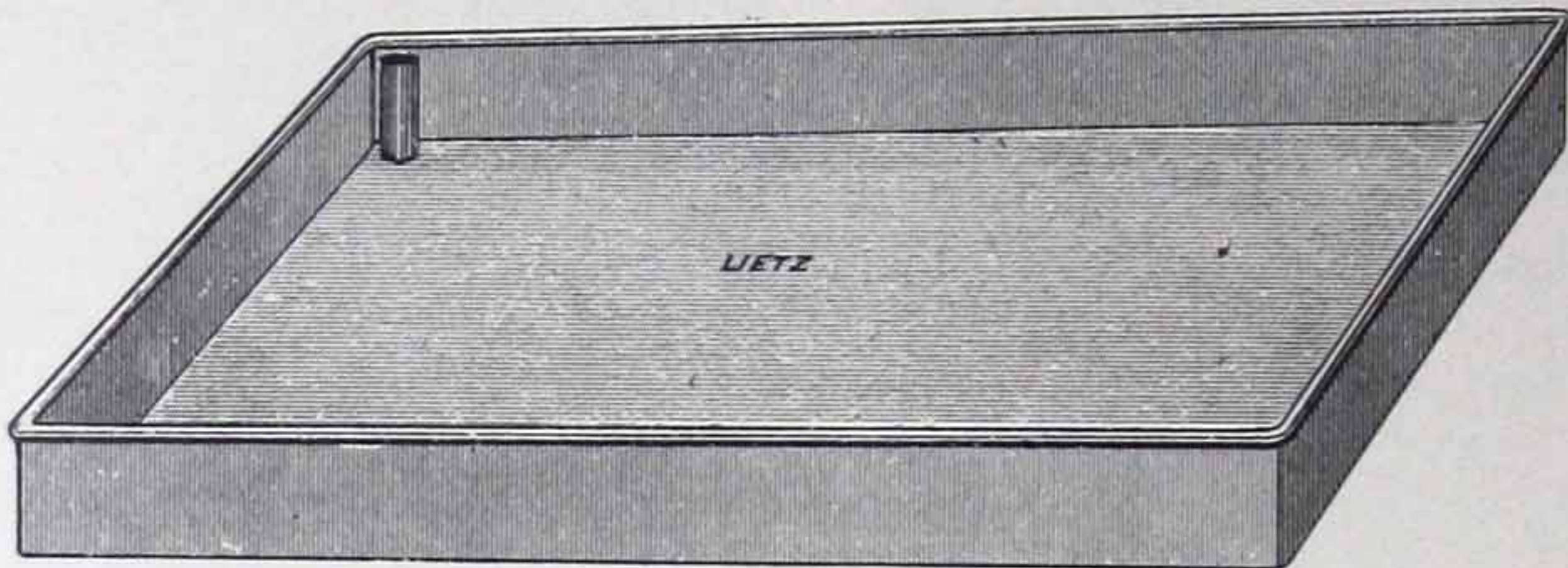
.....Code Word, **KAGADRO**

No. 1278B. Vacuum Outfit same as No. 1278A but with $\frac{1}{2}$ H.P. motor, for frames having a larger printing surface than 44x74.

.....Code Word, **KAGADY**

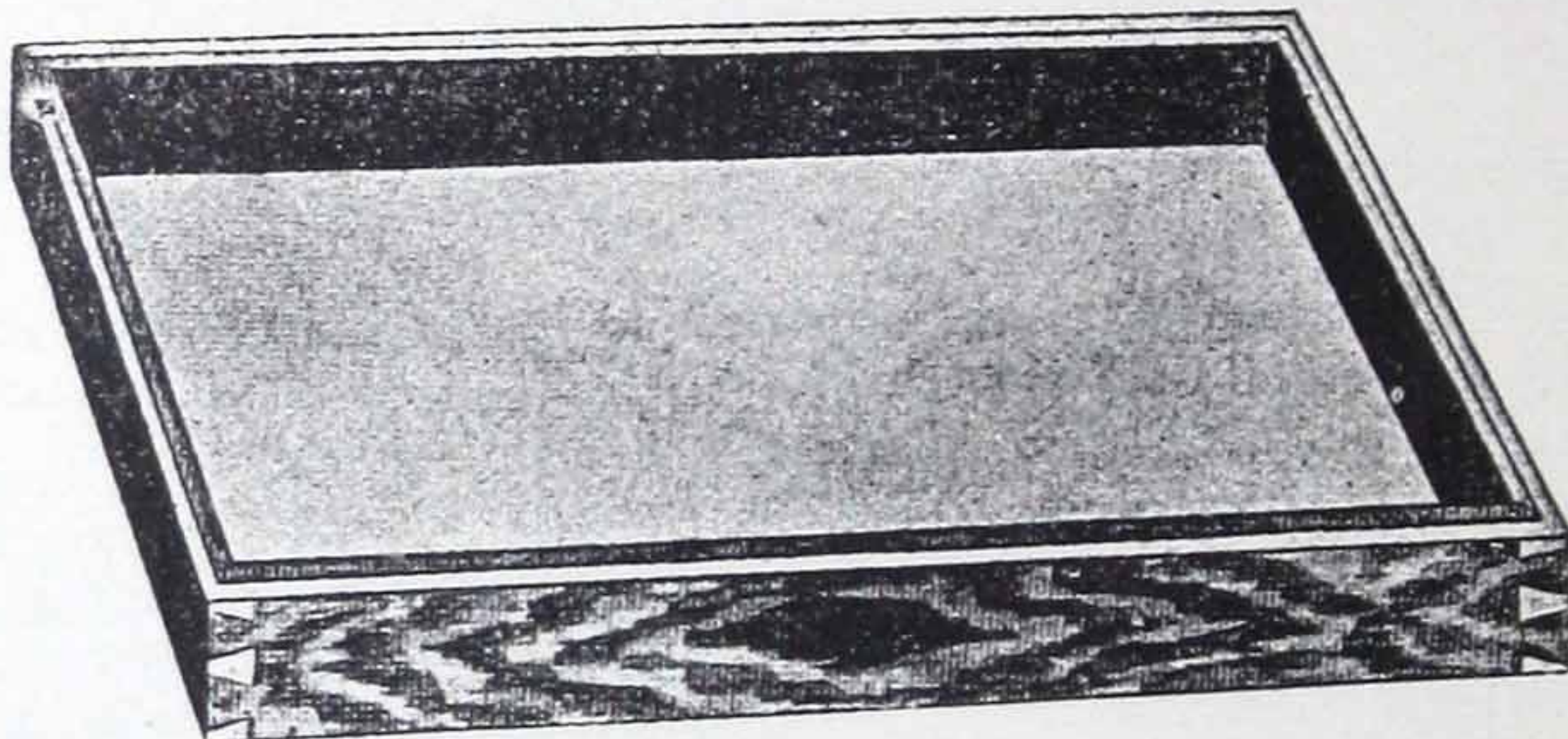
SEE PRICE LIST IN BACK OF CATALOG

ZINC BATH TRAYS



No. 1280

No. 1280.	Plain Zinc Bath Tray with strongly wired rim and drain pipe, 12x17 inches.....	Code Word
	17x22 inches.....	KAGEL
	20x24 inches.....	KAGMINE
	24x30 inches.....	KAGPOOL
		KAGSTEM



No. 1281

No. 1281.	Zinc Bath Tray with strongly wired rim, drain pipe and wooden braces, 20x24 inches.....	Code Word
	24x30 inches.....	KALCUM
	30x42 inches.....	KALDER
	36x48 inches.....	KALDING
	36x60 inches.....	KALE
	42x60 inches.....	KALFY
	42x72 inches.....	KALGER
		KALTON

Prices cover cost of crating for shipment.

SEE PRICE LIST IN BACK OF CATALOG

PEASE MODEL "7" CONTINUOUS BLUE PRINT



Will make prints up to and including 42 inches in width and of unlimited length.

The feeding operation is very convenient and is expedited by the horizontal span of the endless fabric belt extending a full 5 inches ahead of the point of contact with the curved glass. Uniform illumination is provided by an arrangement of mercury vapor tubes mounted in close proximity to the curved section of the polished plate contact glass. All tubes are interchangeable and independently mounted.

The Pease Model "7" Blue Printer can be equipped with either 3 or 4 mercury vapor tubes. The 3 tube machine has a printing speed of 2 feet per minute and the 4 tube machine a printing speed of 2½ feet per minute. The printer is driven by a sturdy variable speed motor and all speeds are controlled by a 28 point rheostat located at the right hand side of the machine. The speed ranges from

4 inches per minute to 60 inches per minute. Separate switches are provided for the motor and each mercury vapor tube. The machine has an extension cord and detachable plug and can be connected into any electrical circuit.

The Pease Model "7" Continuous Printer is sturdily constructed entirely of metal with rigid steel framework and finished overall with 2 coats of olive green baked enamel except the steel feed table which is finished with 2 coats of black dull finish baked enamel. Shipped as one complete unit with the exception of the mercury vapor tubes which are packed separately.

Code Word

- No. 1290.** Pease Model "7" Continuous Blue Print Machine equipped with 3 mercury vapor tubes, wired for 110 volts direct or 60 cycle single phase alternating current. **KALSER**
Approximate shipping weight, 725 lbs.
- No. 1291.** Same as No. 1290 but wired for 220 volts, 60 cycle single phase alternating current. **KALSHA**
- No. 1292.** Pease Model "7" Continuous Blue Print Machine equipped with 4 mercury vapor tubes, wired for 110 volts direct or 60 cycle single phase alternating current. **KALSIN**
Approximate shipping weight, 755 lbs.
- No. 1293.** Same as No. 1292 but wired for 220 volts direct or 60 cycle single phase alternating current. **KASITE**

Complete pamphlets on Pease Blue Print Machines sent on request.

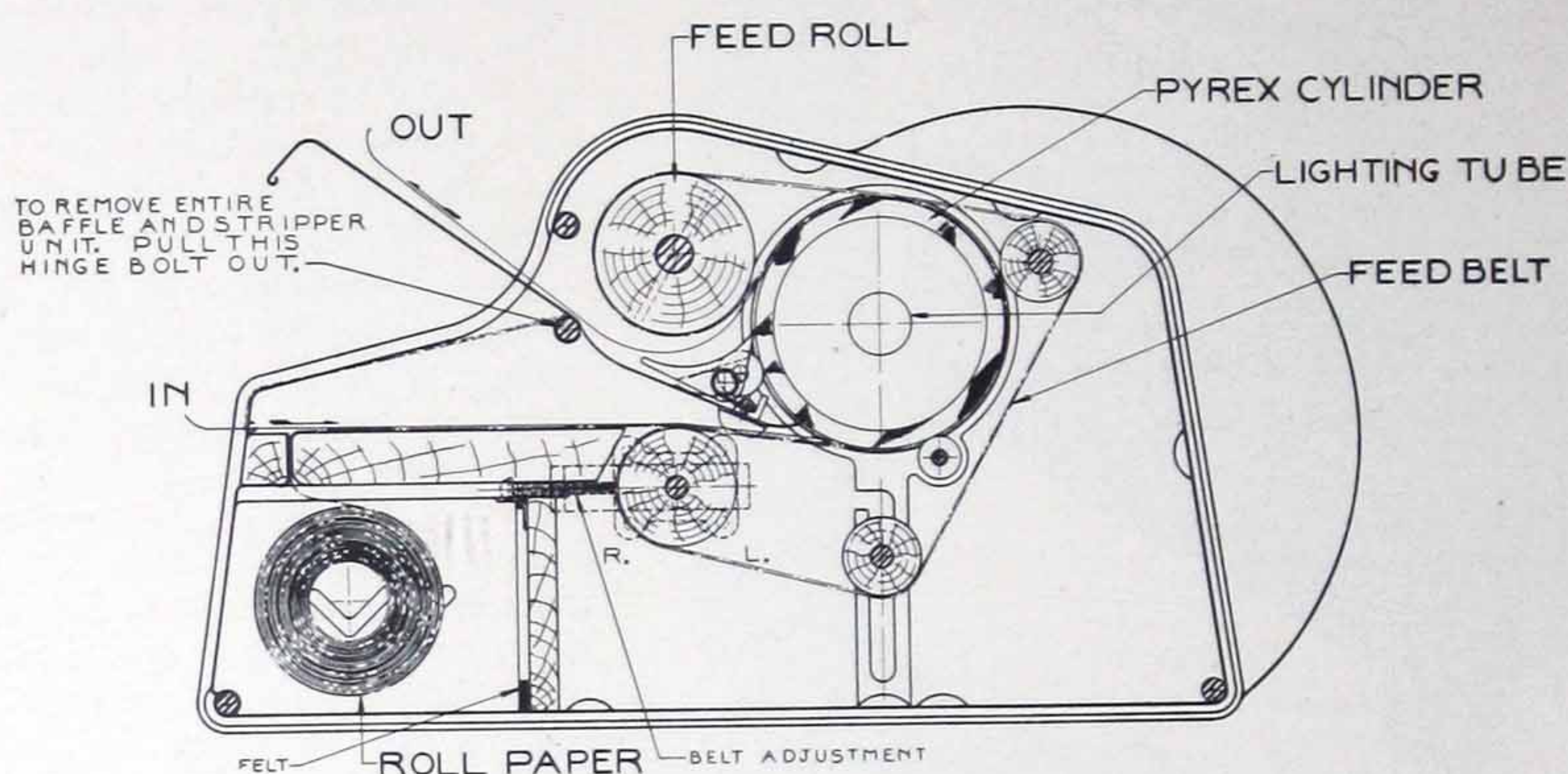
EXTRAS FOR PEASE BLUE PRINT MACHINES

- No. 1294.** Wired for 110 or 220 volts alternating current, 25 or 40 cycle. Extra charge. **KASOD**
- No. 1295.** Wired for 3 phase—extra charge. **KASOLL**
- No. 1296.** Extra mercury vapor lamps for Pease Model "7" Blue Print Machine. **KASONG**

SEE PRICE LIST IN BACK OF CATALOG

WICKES SIMPLEX BLUE PRINTER

Continuous Electric Operation



CROSS SECTION ILLUSTRATING CYCLE.

This machine is ideally suited for use in drafting rooms, manufacturing plants and educational institutions. It offers automatic and continuous production of blueprints, Ozalid prints, negatives and other direct process prints from tracings either in continuous rolls up to 46 inches in width or separate sheets. The Wickes Simplex Blue Printer has a capacity of 1800 square feet per 8 hour day using our rapid printing papers. The feed is one plain endless belt surrounding a pyrex cylinder driven by a motor of ample horsepower. The machine starts instantly. There are no gears or belts to shift and an experienced operator is not necessary. The light is obtained from a standard mercury vapor lamp. The weight of the Wickes Simplex Blue Printer is only 220 lbs. It occupies a floor space of 22 inches by 68 inches and is 11 inches high. Total current required is 5 amperes, 110 volt.

Code Word

No. 1300. Wickes Simplex Blue Printer complete with motor, mercury vapor lamp and all equipment. **KAMACK**

Approximate domestic shipping weight: 375 lbs.
Boxed for export: 425 lbs.
Extra charge for export boxing: \$10.00.

When ordering please specify current, if alternating or direct. If alternating give frequency of cycles.

Complete pamphlet fully describing and illustrating the Wickes Continuous Electric Blue Printing Machine will be sent upon request.

EXTRA LAMPS FOR BLUE PRINT MACHINES

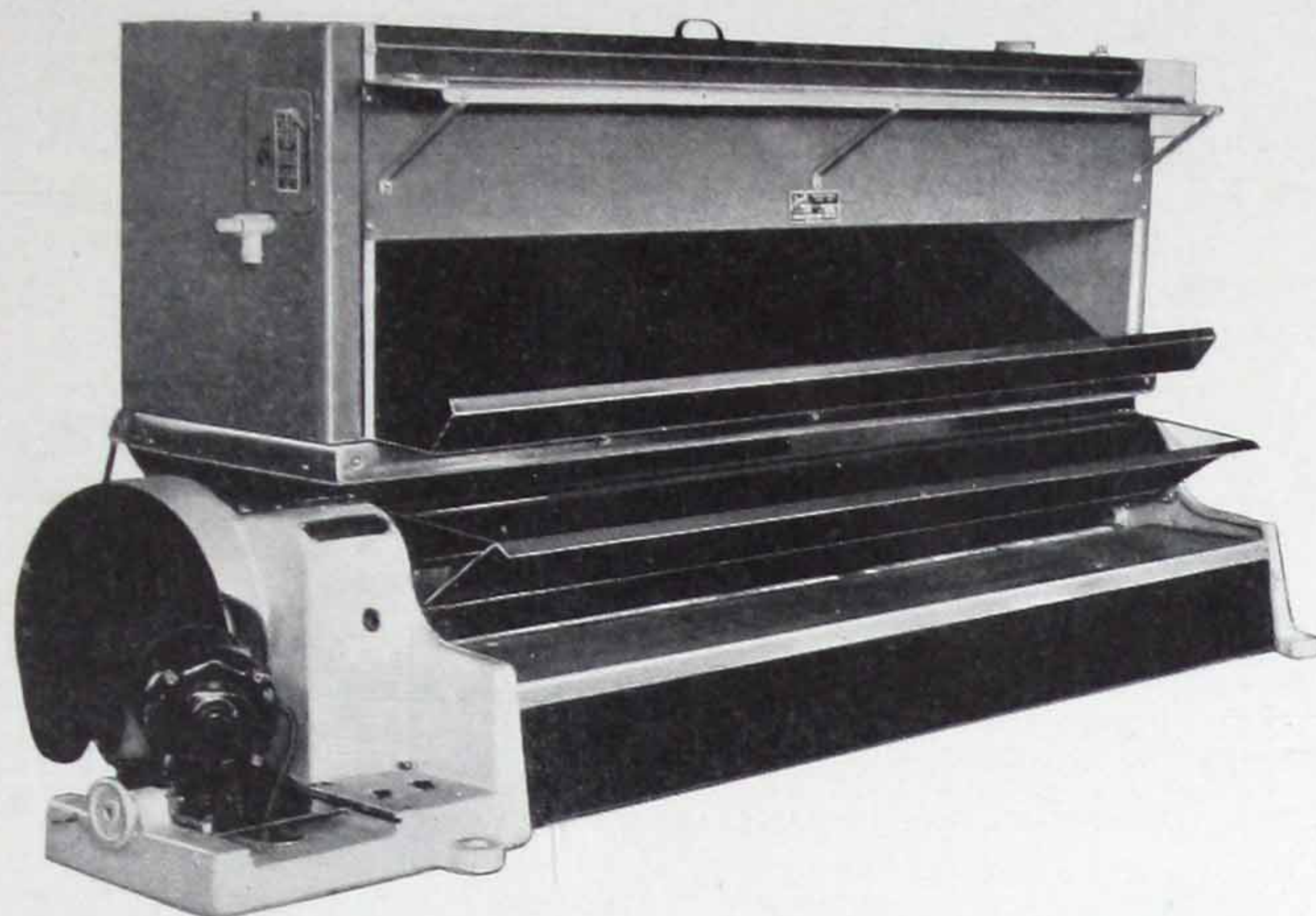
Code Word

No. 1302. Mercury Vapor Lamp for Wickes Simplex Blue Printer. . . **KAMARY**

No. 1309. Extra Mercury Vapor Lamp for old type Model 15 and Model 20 Wickes Blue Print Machine. **KARYO**

SEE PRICE LIST IN BACK OF CATALOG

WICKES SIMPLEX PRINTER AND OZALID DEVELOPER COMBINED



This machine makes available to mines, manufacturers, schools, engineering and architects' offices all of the many advantages of the Ozalid processes. The Ozalid Developer is mounted directly on a Wickes Blue Printer. It is small, compact and very economical in operation and completely develops Ozalid sensitized materials up to 42 inches in width at a speed of 32 inches per minute. It is equipped with a ventilator pipe and exhaust blower for removing from the machine and the surface of the developed prints all excess ammonia fumes thereby preventing the escape of the ammonia fumes into the room where the equipment is in use. The developer operates from a base plug and is wired for 110-115 volts A. C. 60 cycles single phase. Other currents available at small additional cost.

Code Word

- No. 1305. Wickes Simplex Blue Printer complete with Ozalid Developer..... **KASAAL**
(Approximate shipping weight 525 lbs.)

OZALID DEVELOPING MACHINES

The Ozalid Developing Machine described above may be purchased separately. It is available in two sizes.

Code Word

- No. 1306. Ozalid Developing Machine, printing speed 32 inches per minute, for sensitized materials up to 42 inches in width..... **KASAALER**
(Shipping weight 207 lbs.)
- No. 1307. Same as No. 1306 but for sensitized materials up to 54 inches in width.... **KASAALOT**
(Shipping Weight 240 lbs.)

When ordering please specify current.

Repair Parts for Wickes Simplex Blue Printer

Code Word

- No. 1301A. Rubber Friction Hubs..... **KAMAD**
No. 1301B. Shifter for Auxiliary..... **KAMAFT**
No. 1301C. Glass Cylinder..... **KAMAGE**
No. 1301D. Canvas Belt..... **KAMAID**
No. 1301E. Motor..... **KAMALT**
No. 1301F. Electric Switches..... **KAMAMO**

Accessories for Model 15 and 20 Wickes Machines

(Our old Nos. 1307 and 1308)

Code Word

- No. 1310. Rubber Friction Hubs..... **KASPO**
No. 1311A. Wire Cylinder..... **KASRYN**
No. 1311B. Glass Cylinder..... **KASTEL**
No. 1311C. Canvas Belt..... **KASWELL**

SEE PRICE LIST IN BACK OF CATALOG

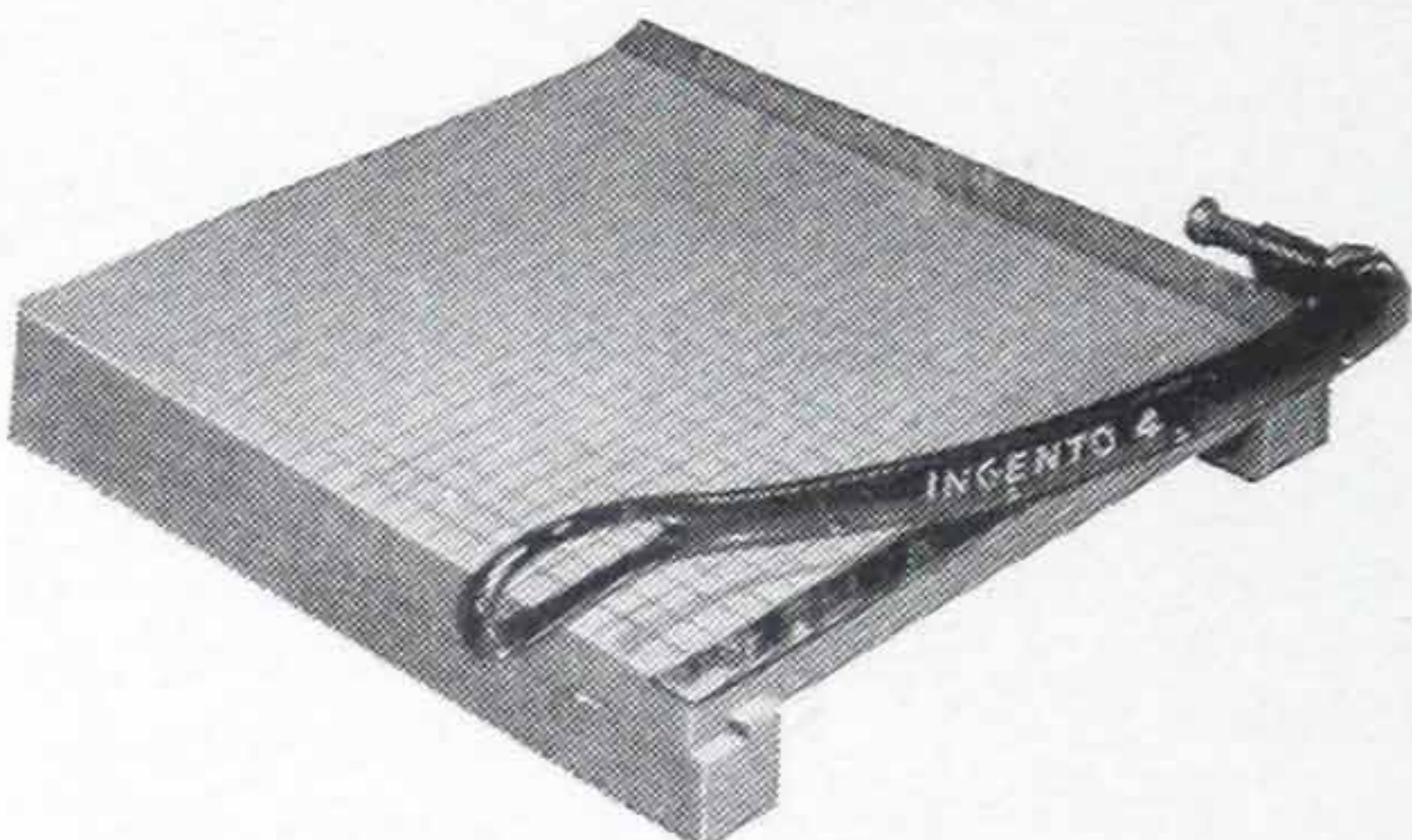
BLUE PRINT ROOM REQUISITES



No. 1312. Wooden Spring Clips for clamp- ing prints when drying. Doz.Code Word, **KATA**



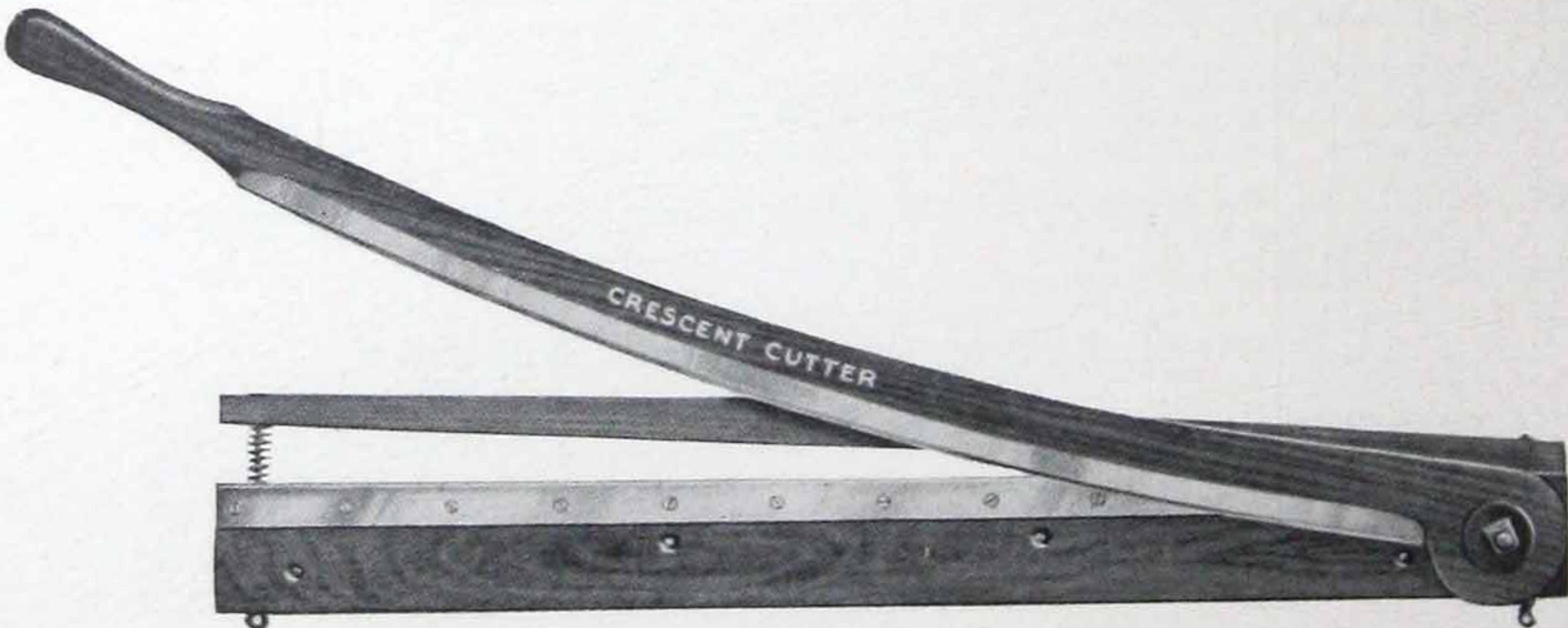
No. 1314. Trimming Shears, nickel-plated. Size, in. 10 12 14
Code Word.....**KATAD KATALE KATANA**



No. 1316

Our card and paper trimmers are made of the best material. Thoroughly seasoned hardwood bed ruled into half-inch squares with ruler at top with 1/8 inch graduations. The steel blades are made of high grade tool steel properly tempered and they will retain their keen cutting edge under continued hard usage. The springs hold the handle at any desired height without danger of dropping, permitting use of both hands for aligning materials to be cut. The 15, 18 and 24 inch cutters will cut cloth, leather, rubber and sheet metal.

No. 1316. Size of blade, inches..... 8 10 12 15 18 24
Code Word..**KEDA KEDAR KEDACK KEDDY KEDEL KEDIT**



No. 1317

No. 1317. "Crescent" Paper Trimmer, 33-inch blade, for attaching to end of cutting table.....Code Word, **KEDIVE**

SEE PRICE LIST IN BACK OF CATALOG

STANDARD CONTRACT DOCUMENTS OF THE AMERICAN INSTITUTE OF ARCHITECTS

These Documents have received the full approval of the Institute, through its Conventions, Board of Directors and Officers. They are the outcome of continuous work of many years by a Standing Committee on Contracts and Specifications. This Committee, comprising some of the ablest American architects, was assisted by the Institute's forty Chapters; advised by eminent legal specialists in contract law, and aided by representatives of the leading construction interests in the United States.

The forms have been officially approved by the National Association of Builders' Exchanges, the National Association of Master Plumbers, the National Association of Sheet Metal Contractors of the United States, The National Electrical Contractors' Association of the United States, the National Association of Marble Dealers, the Building Granite Quarries Association, the Building Trades Employers Association of the City of New York, and the Heating and Piping Contractors National Association.

		Code Word
		Per 100 Each
No. 1335B.	General Conditions without Agreement.....	KIB
No. 1335BB.	Form of Agreement between Owner and Contractor when stipulated sum forms the basis of payment....	KIBA
No. 1335A.	Agreement and General Conditions in cover consist- ing of Nos. 1335B and 1335BB with cover and ex- planatory notes.....	KIBART
No. 1335C.	Bond of Suretyship.....	KIBEL
No. 1335D.	Form of Subcontract.....	KIBEST
No. 1335E.	Letter of Acceptance of Subcontractor's Proposal...	KIBID
No. 1336A.	Cover (heavy paper with valuable notes).....	KIBICK
No. 1336.	Complete set in cover.....	KIBILL

OTHER CONTRACT FORMS

No. 1335F.	Form of Agreement between Owner and Architect on the Percentage Basis.....	KIBOD
No. 1335H.	Form of Agreement between Owner and Architect on the Fee Plus Cost System.....	KIBOFF
No. 1335I.	Circular of Information on Fee Plus Cost System (Owner-Architect).....	KIBOLE
No. 1335J.	Form of Agreement between Owner and Contractor (Cost Plus Fee Basis).....	KIBONT
No. 1335K.	Circular of Information on Cost Plus Fee System (Owner-Contractor).....	KIBOON
No. 1335L.	Short Form for Small Construction Contracts, espe- cially valuable in small house work.....	KIBORN

SPECIFICATION AND AGREEMENT FORMS

<div style="display: flex; justify-content: space-between;"> <div> \$ [REDACTED] </div> <div>_____ 19</div> </div>	
<i>To</i> _____	
This is to Certify, That _____	
Contractor for the _____ of _____	
_____ entitled to a payment of	
_____ DOLLARS,	
by the terms of Contract.	
Contract Price . . \$ _____	SUPERINTENDENT _____ Remarks: _____
Extra Work . . \$ _____	
Total Am't issued. \$ _____	
Balance . . \$ _____	

No. 1330

	Code Word
No. 1330. Architects' Certificate Books, book of 100 with stubs.	KIBROW

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DRAWING INSTRUMENTS

FACTS TO BE CONSIDERED IN SELECTING

The *varieties* and qualities of drawing instruments are now so numerous and the finish in all so very similar, even though the intrinsic values are far greater in some than in others, that it is sometimes difficult to grasp the actual and comparative values of an instrument.

The *quality* can be determined only by the efficiency and durability of the instrument in actual use. The life and efficiency of drawing instruments depend entirely upon the qualities of the materials or metals employed in their manufacture and *not on the finish*; upon careful and conscientious workmanship and on their design and general form. Our stock includes a variety of instruments that will fully meet all requirements of the professional man and the student.

DESCRIPTION OF THE VARIOUS GRADES

Zenith Drawing Instruments—Neither labor or expense has been spared to produce these instruments of super quality. The materials employed are the finest cold-rolled nickel-silver and the highest grade tool steel. They are made to exacting specifications by skilled workmen and are superior in fitting, balance, precision and design. The pens are constructed of a special hard steel properly tempered to give long service under hard usage. The instrument cases are of genuine leather lined with the best silk velvet.

Peerless Drawing Instruments—These instruments are the highest grade in the flat type. They are constructed of the finest nickel-silver and tool steel cold-rolled to extreme hardness. Each instrument beautifully finished and highly polished. By reason of the special construction of the ball joint and the straightening device, the compasses and dividers never become loose or work unevenly. The pens are of the finest quality steel and unequaled for their extreme hardness and toughness. The threads of the adjusting screws are all cut very deep and coarse, especially those of the center adjustment bows, to insure quick motion and to avoid the disagreeable stripping.

Superior Drawing Instruments—These instruments are similar in design to the Zenith Drawing Instruments. They are high grade in every respect, made of hard rolled nickel-silver and highest grade tool steel. Finest grade workmanship and finish.

Reliable Drawing Instruments—A very popular line of exceptional value. They are guaranteed to be perfectly assembled and nicely fitted to give satisfactory results. Made of hard-rolled nickel silver and tool steel.

Universal Drawing Instruments—These are of excellent design and exceptional value. With proper care will give long and satisfactory service. Made of hard rolled nickel silver and tool steel. For the purposes of the student or one having occasional need for drawing instruments this line is admirably adapted.

Marvel Drawing Instruments—A very popular line of exceptional value. Due to their low cost and excellent features they are very popular in manual training schools.

Banner Drawing Instruments—These are well built of good materials and workmanship, incorporating many of the refinements usually only found in better sets.

ZENITH DRAWING INSTRUMENTS



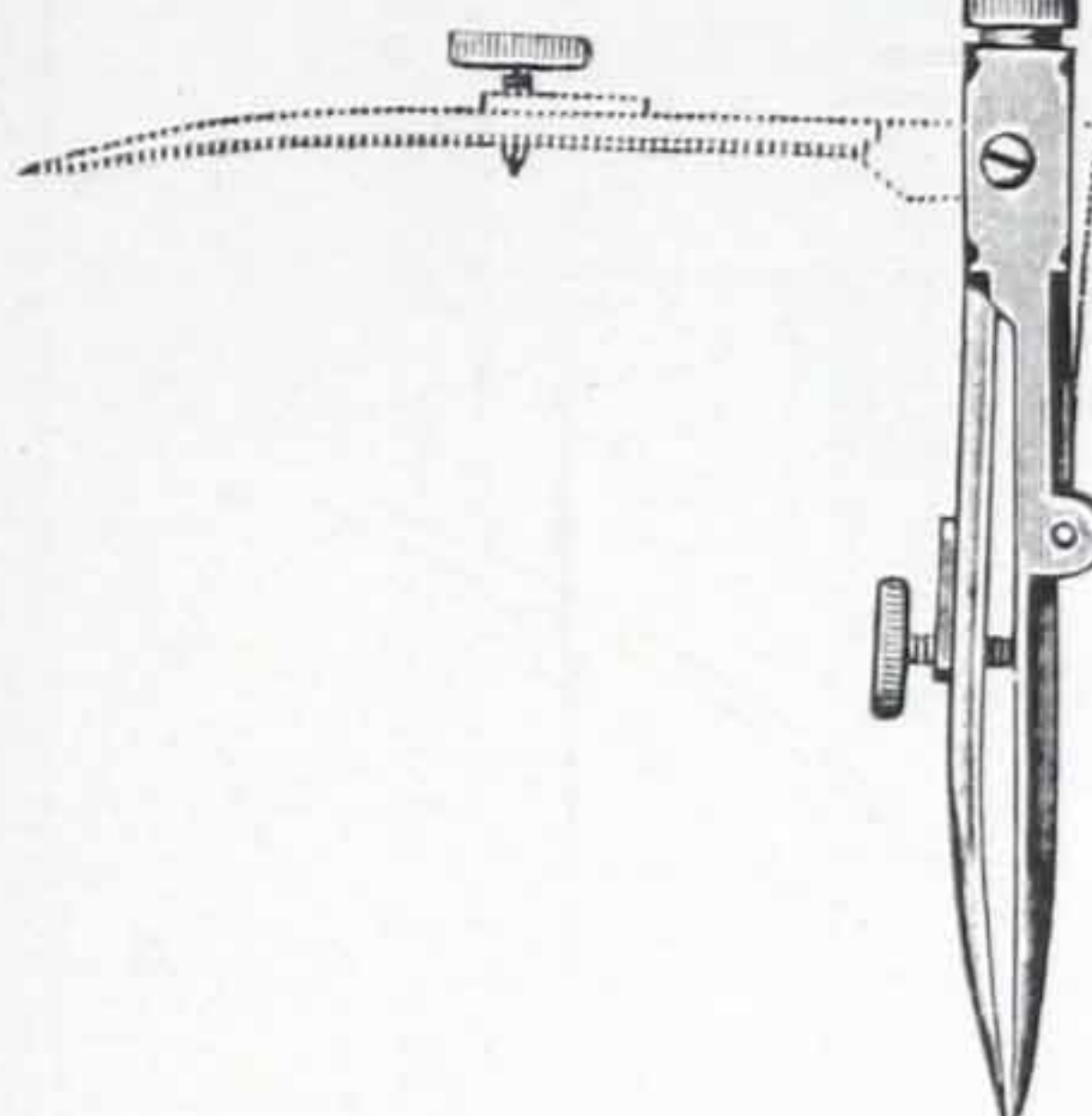
No. 1400



No. 1401



No. 1402



No. 1405

- | | | Code Word |
|------------------|--|---------------|
| No. 1400. | Zenith Ruling Pen, Spring Blade, Ebony Handle,
4½ inch..... | LABAD |
| No. 1401. | Zenith Ruling Pen, Spring Blade, Ebony Handle,
5 inch..... | LABEN |
| No. 1402. | Zenith Ruling Pen, Spring Blade, Ebony Handle,
5½ inch..... | LABERT |
| No. 1403. | Zenith Ruling Pen, Knife Spring, Ebony Handle,
4½ inch..... | LABOCK |
| No. 1404. | Zenith Ruling Pen, Knife Spring, Ebony Handle,
5 inch..... | LABODE |
| No. 1405. | Zenith Ruling Pen, Knife Spring, Ebony Handle,
5½ inch..... | LABOLA |

Knife Spring Ruling Pens can be instantly opened and thoroughly cleaned and closed to the same position without changing the adjustment for width of line.

SEE PRICE LIST IN BACK OF CATALOG

ZENITH DRAWING INSTRUMENTS



No. 1406 No. 1407 No. 1408 No. 1410 No. 1411 No. 1412

- | | | | | | |
|-----------|--|--|--|--|------------------|
| | | | | | Code Word |
| No. 1406. | Zenith Ruling Pen with Joint and Pin, 4½ inch..... | | | | LACER |
| No. 1407. | Zenith Ruling Pen with Joint and Pin, 5 inch..... | | | | LACIS |
| No. 1408. | Zenith Ruling Pen with Joint and Pin, 5½ inch..... | | | | LACKMAR |
| No. 1410. | Zenith Detail Pen, Spring Blade, Ebony Handle, 5 inch. | | | | LACKTON |
| No. 1411. | Zenith Detail Pen, Spring Blade, Ebony Handle, 6 inch. | | | | LACKVILLE |
| No. 1412. | Zenith Detail Pen, Spring Blade, Ebony Handle, 7 inch. | | | | LACKTILE |

SEE PRICE LIST IN BACK OF CATALOG

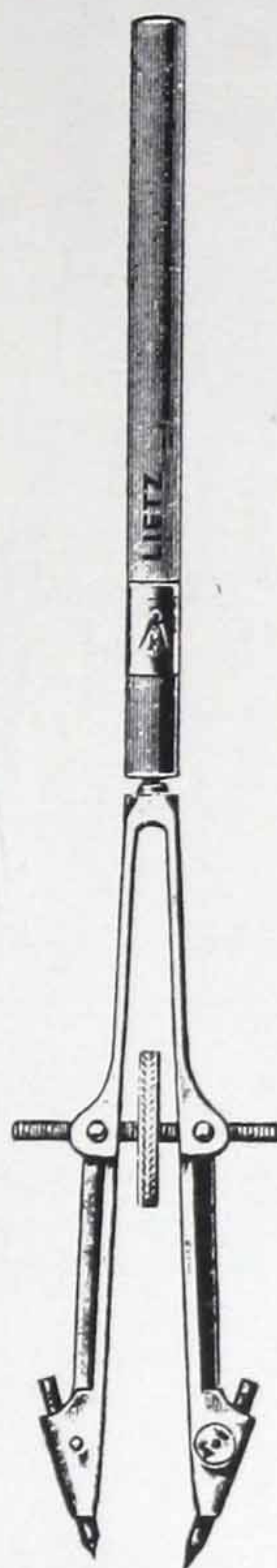
ZENITH DRAWING INSTRUMENTS



No. 1414



No. 1415



No. 1416



No. 1424



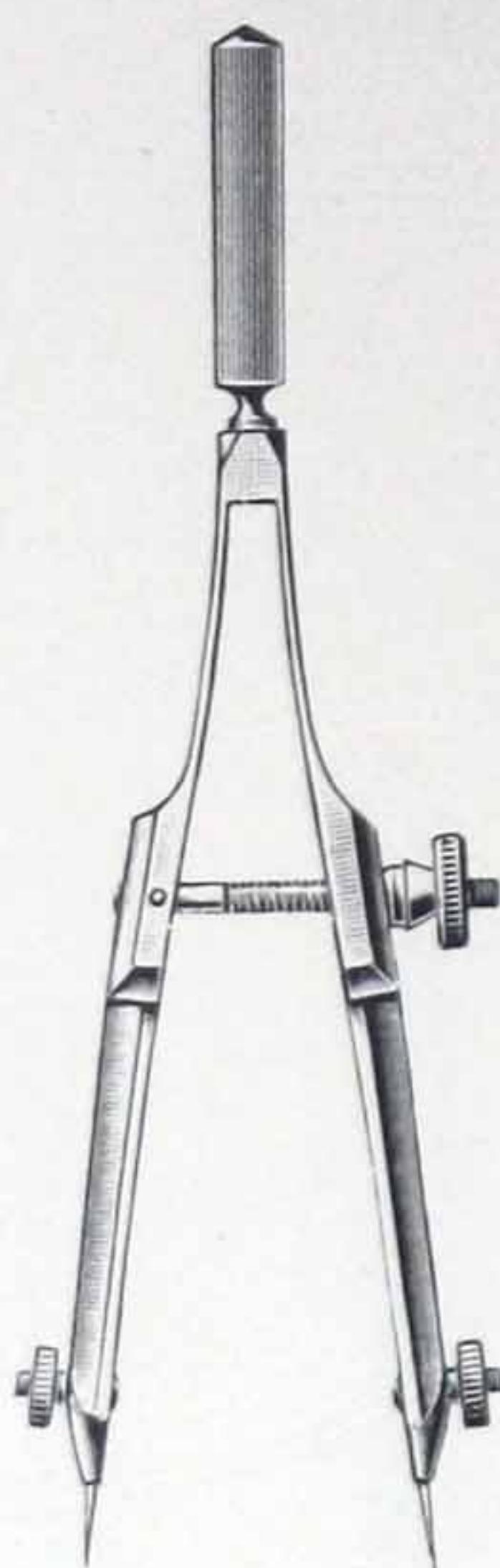
No. 1426

	Code Word
No. 1414. *Zenith Contour Pen, Spring Blade, $4\frac{1}{4}$ inch.....	LAD
No. 1415. *Zenith Railroad Pen, Spring Blades, $5\frac{1}{4}$ inch.....	LADDIE
No. 1416. Zenith Railroad Pencil, Center Screw Adjustment, $5\frac{1}{2}$ inch.....	LADURE
No. 1424. Pricker, ebony handle.....	LADWIN
No. 1426. Tracer, aluminum handle.....	LADY

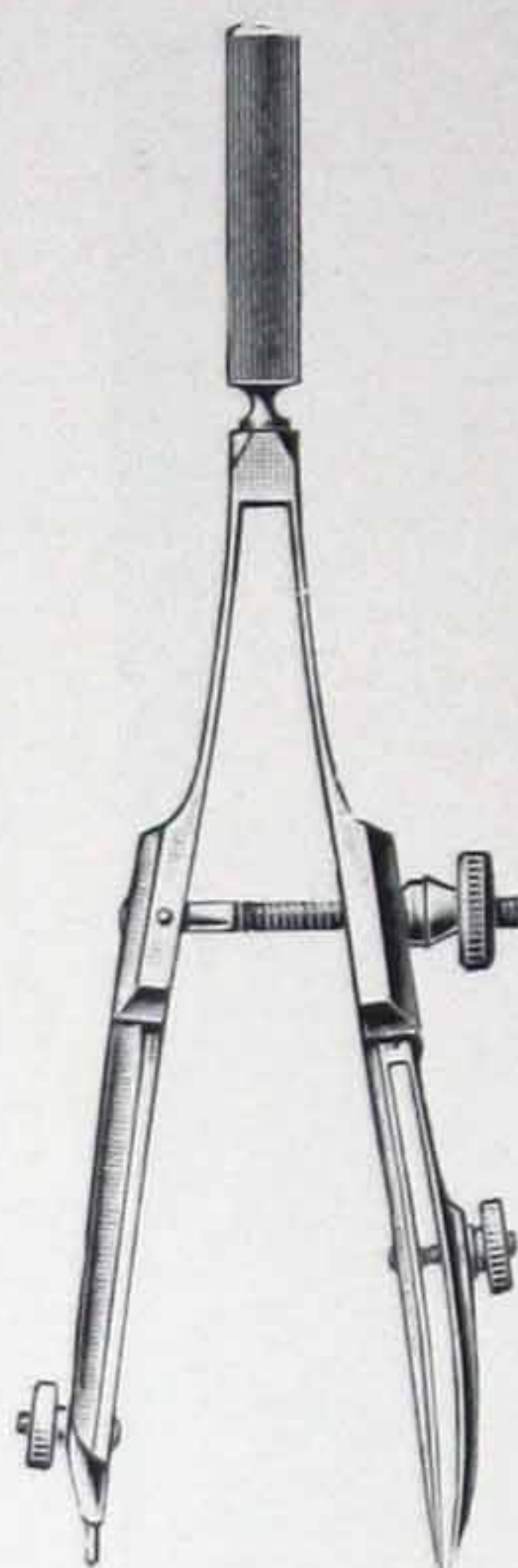
*Pens Nos. 1414 and 1415 are fastened to a rod which swivels in the hollow handle and thus follows the smallest curve with precision. The rod may be locked by means of a nut at the upper end, and the instrument may be used as an ordinary drawing or railroad pen.

SEE PRICE LIST IN BACK OF CATALOG

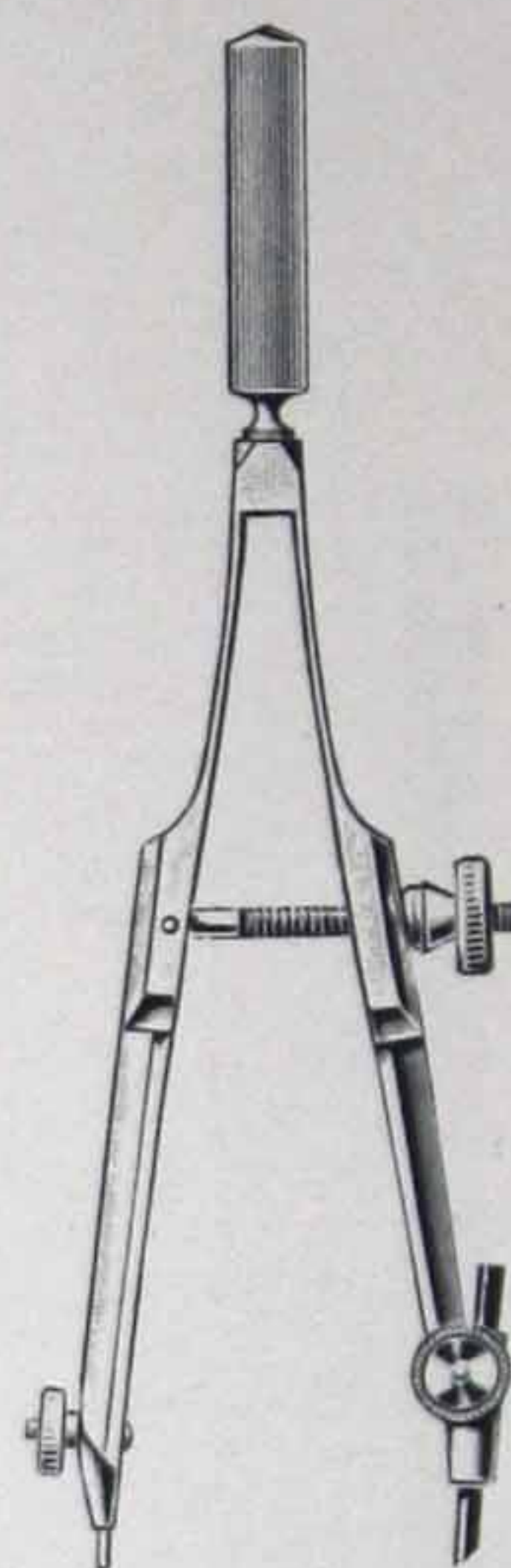
ZENITH DRAWING INSTRUMENTS



No. 1430S

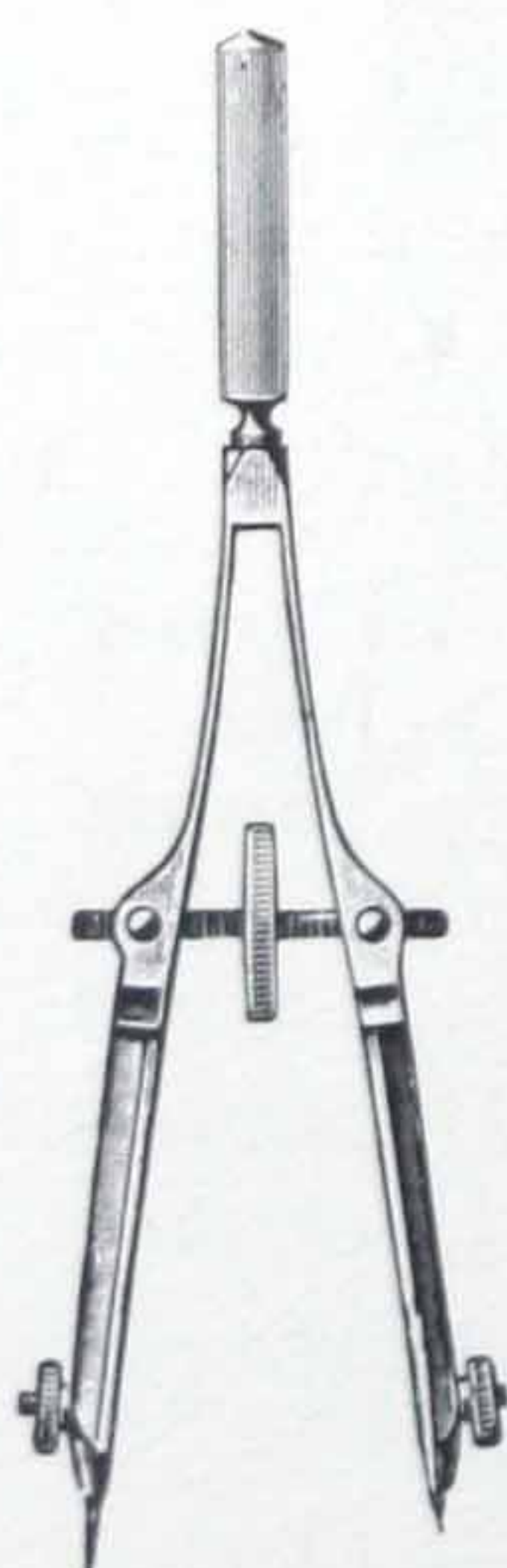


No. 1432S

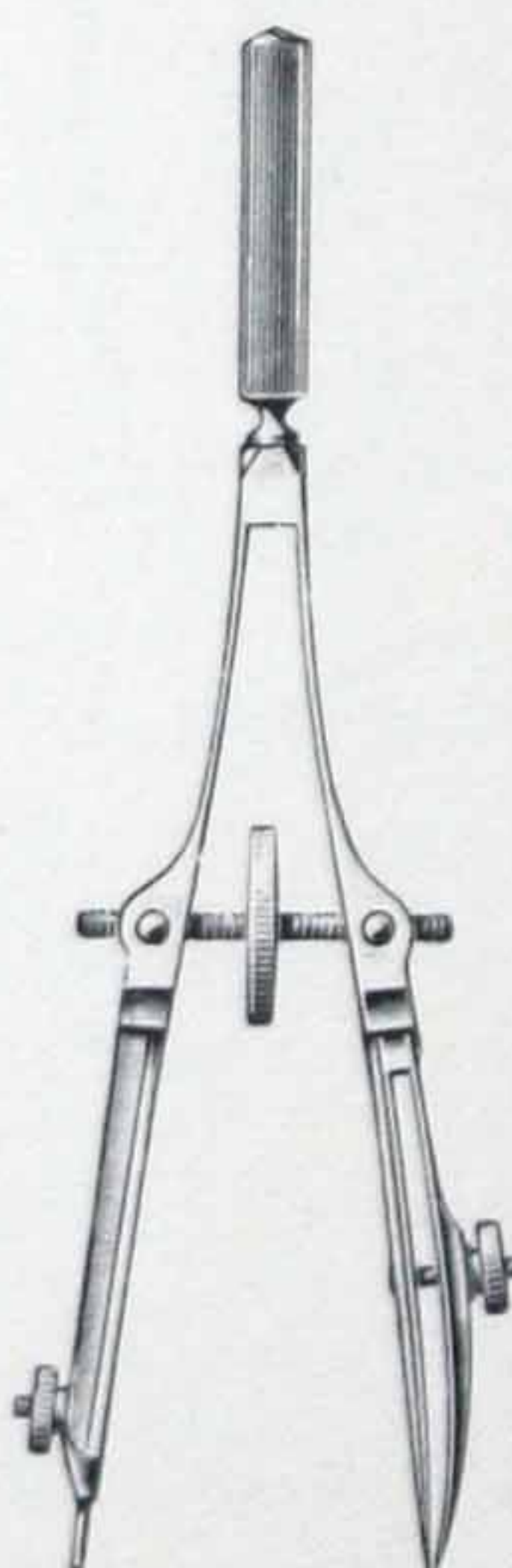


No. 1434S

- | | | |
|------------|---|-----------------|
| No. 1430S. | Zenith Bow Divider, Side Adjustment, 3½ inch..... | Code Word |
| No. 1432S. | Zenith Bow Pen, Side Adjustment, 3½ inch..... | LADLE |
| No. 1434S. | Zenith Bow Pencil, Side Adjustment, 3½ inch..... | LADRONE |
| | | LADYBIRD |



No. 1440C



No. 1442C

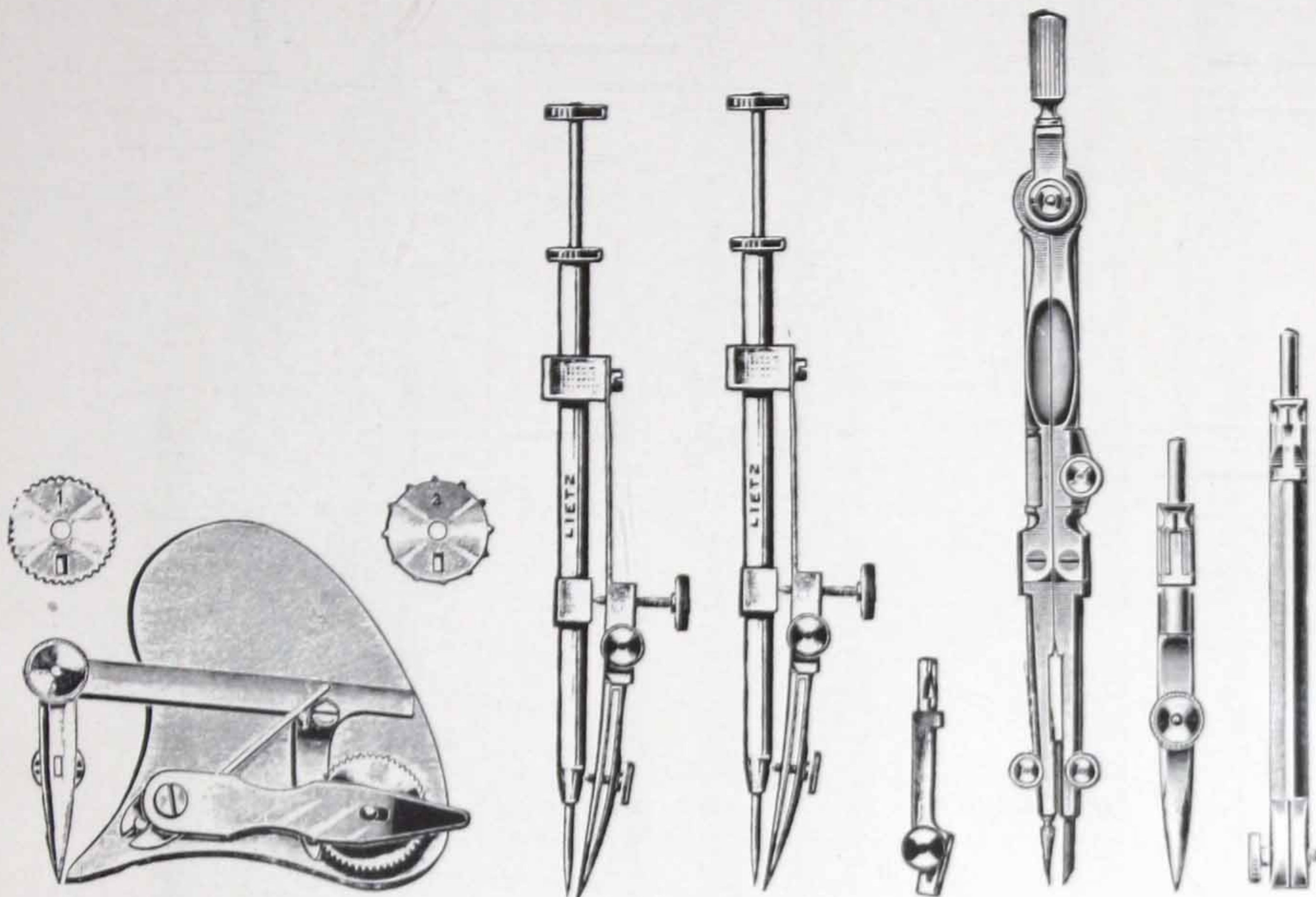


No. 1444C

- | | | |
|------------|--|---------------|
| No. 1440C. | Zenith Bow Divider, Center Adjustment, 3½ inch... | Code Word |
| No. 1442C. | Zenith Bow Pen, Center Adjustment, 3½ inch..... | LAER |
| No. 1444C. | Zenith Bow Pencil, Center Adjustment, 3½ inch..... | LAFIN |
| | | LAFORK |

SEE PRICE LIST IN BACK OF CATALOG

ZENITH DRAWING INSTRUMENTS



No. 1465D

No. 1466

No. 1467C

No. 1472NL

No. 1465D. Dotting Instrument with three wheels in case..... Code Word **LAMA**

By throwing back the spring, the wheels of different patterns are inserted. The wheel is rolled on the edge of a T-square or straight-edge and causes the pen by means of a ratchet wheel to move up and down.

No. 1466. Zenith Drop Spring Bow Pen, 4 inch..... Code Word **LAMBENT**

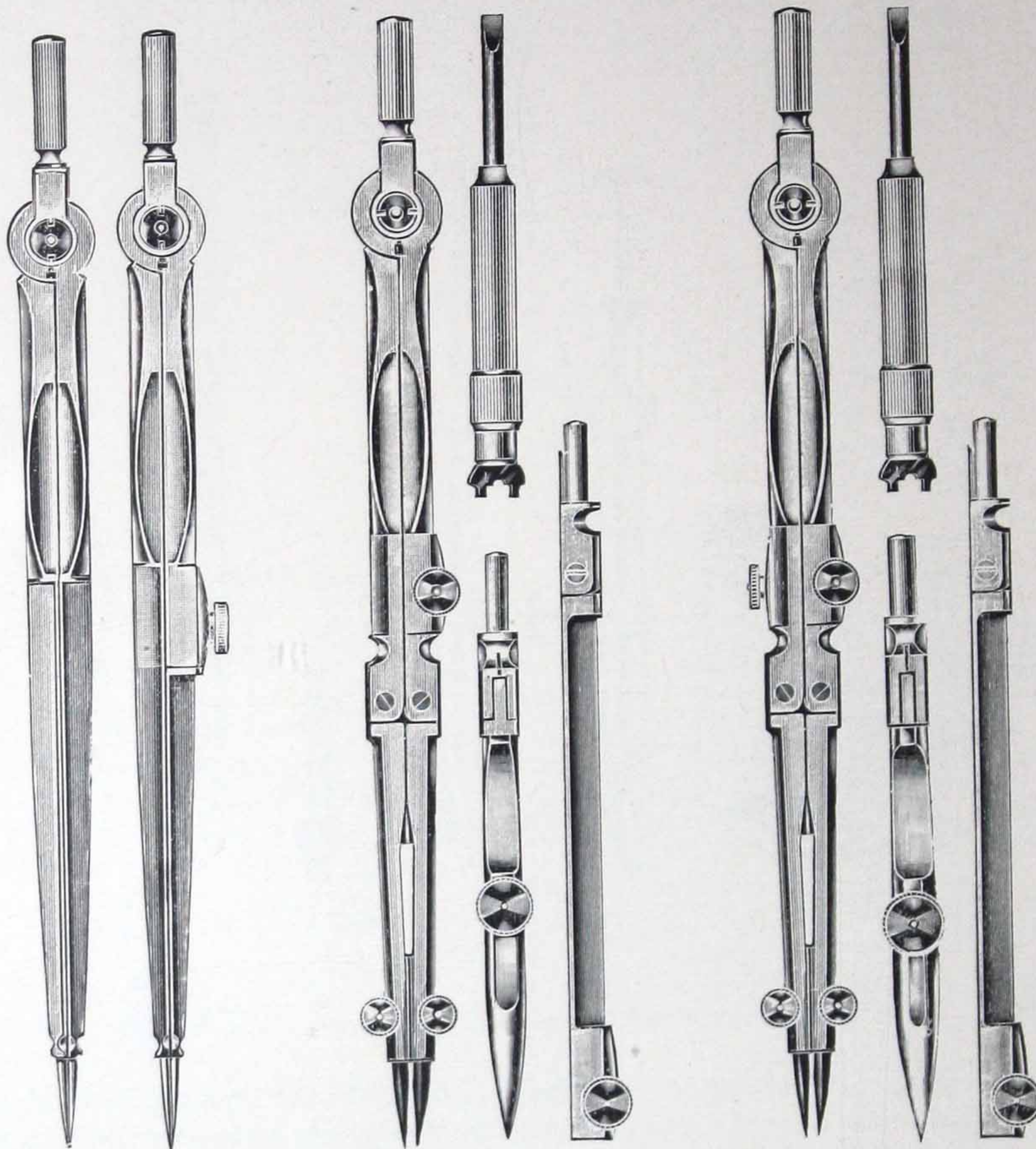
No. 1466C. Zenith Drop Spring Bow Pen, in velvet-lined case, 4 inch..... **LAMBER**

No. 1467C. Zenith Drop Spring Bow Pen with Pencil Part, 4 inch (in case)..... **LAMKIN**

No. 1472NL. Zenith Compasses, 4¼ inch, with fixed needle point, pen and pencil parts and lengthening bar..... **LAMELLA**

SEE PRICE LIST IN BACK OF CATALOG

ZENITH DRAWING INSTRUMENTS



No. 1470-2 No. 1471

No. 1474 $\frac{3}{4}$

No. 1474 $\frac{3}{4}$ H

No. 1470-2	Zenith Plain Dividers, 6 inch.....	Code Word LAMINA
No. 1471.	Zenith Hairspring Dividers, 6 inch.....	LAMPOON
No. 1474 $\frac{3}{4}$.	Zenith Compasses, 6 inch, with fixed needle point, pen and pencil parts and lengthening bar.....	LAMPREY
No. 1474 $\frac{3}{4}$ H.	Zenith Compasses, 6 inch, with Hairspring , fixed needle point, pen and pencil parts and lengthening bar.....	LANAT

SEE PRICE LIST IN BACK OF CATALOG

EXTRA PARTS FOR ZENITH DRAWING INSTRUMENTS

For Ruling Pens

- No. 1485A. Screw or bolt and nut for pens.....
B. Slide Catch Device for pens.....
C. Handles for Pens, Ebony or Aluminum.....

For Bow Instruments

- No. 1485D. Adjusting nut for side screw type (nut only).....
E. Bolt or spindle for side screw type (without nut).....
F. Center Wheel Assembly, complete.....
G. Clamp Nuts and Bolts for needle points.....
H. Clamp Screws for Pencil Points.....
I. Screw or bolt and nut for pen points.....
J. German Silver Handle for Bow Instruments.....

For Dividers

- No. 1485K. Nut and bolt for hairspring adjustment.....
L. Clamp Nuts and Bolts for Needle Points.....

For Compasses

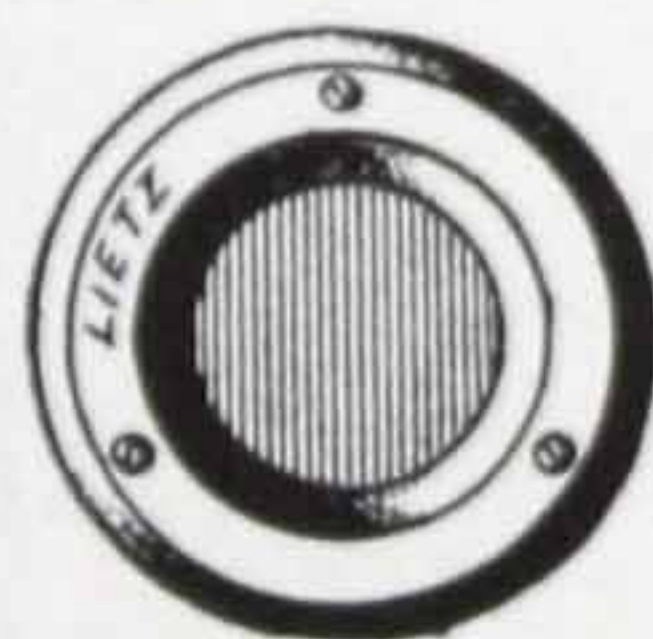
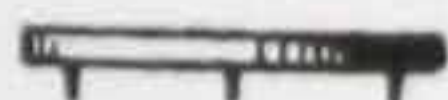
- No. 1485M. Clamp Screws to hold Pen or Pencil Parts.....
N. Clamp Screws to hold Needle or Lead.....
O. Screw or bolt and nut for pens.....
P. Headscrews for Compasses.....
Q. Straightening Device for Compasses.....
R. German Silver Handle for Compasses.....
S. Pencil Part complete.....
T. Pen Part complete.....
U. Lengthening Bar complete.....

Miscellaneous Parts

- No. 1485-4. Combination Key and Lead Box.....
5. Metal Handle, containing Needle points, and to fit parts of
large Compass.....
6. Metal Handle, containing Needle points, and to fit parts of
small Compass.....
7. Center Tack.....



1486



1486R



1487



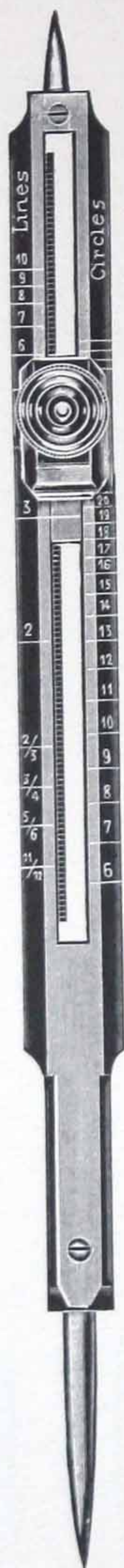
1489-A B C D E F

Each

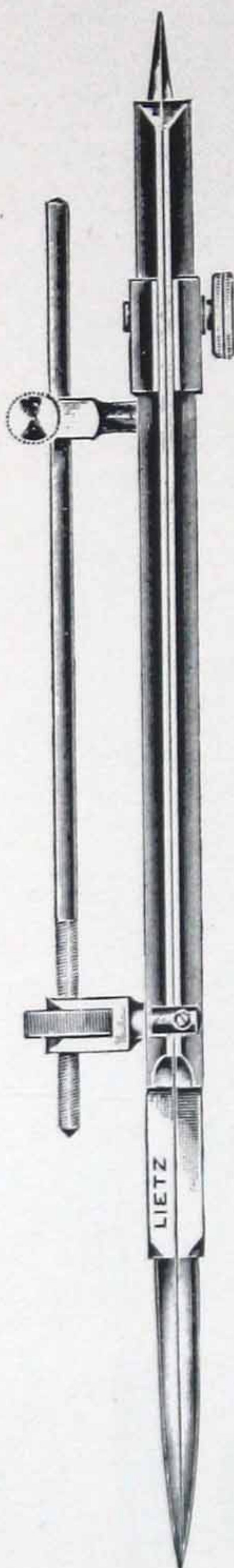
- No. 1486. Horn Center, $\frac{1}{2}$ -inch diameter, plain, for resting compass or
divider over given point.....
No. 1486R. Horn Center, $\frac{3}{4}$ -inch diameter, with German silver rim.....
No. 1487A. German Silver Box containing leads for instruments.....
No. 1487B. Tin Box containing three leads for instruments.....
No. 1489. Extra Needle Points for instruments (order by letter).....

SEE PRICE LIST IN BACK OF CATALOG

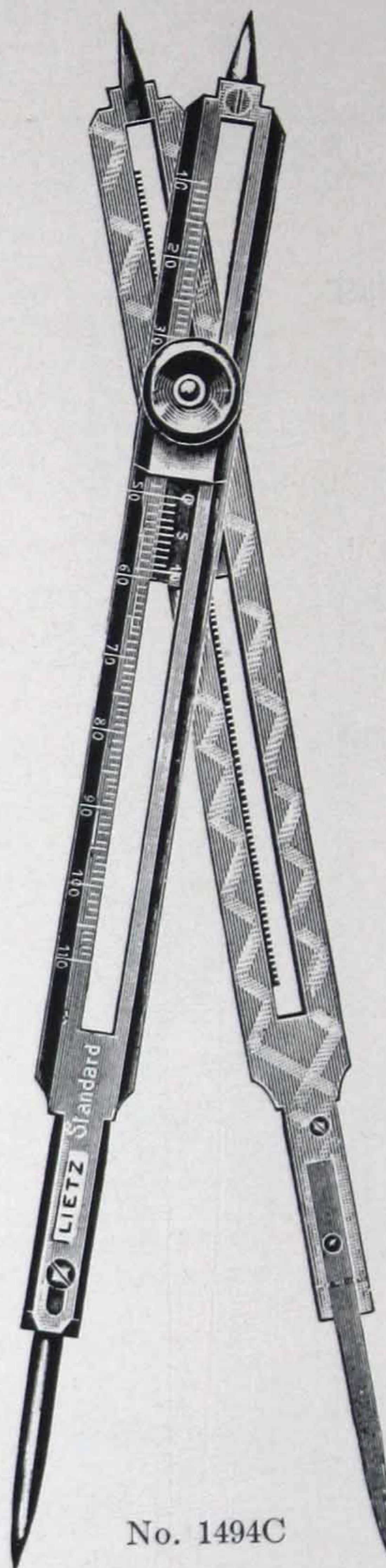
ZENITH DRAWING INSTRUMENTS



No. 1491C



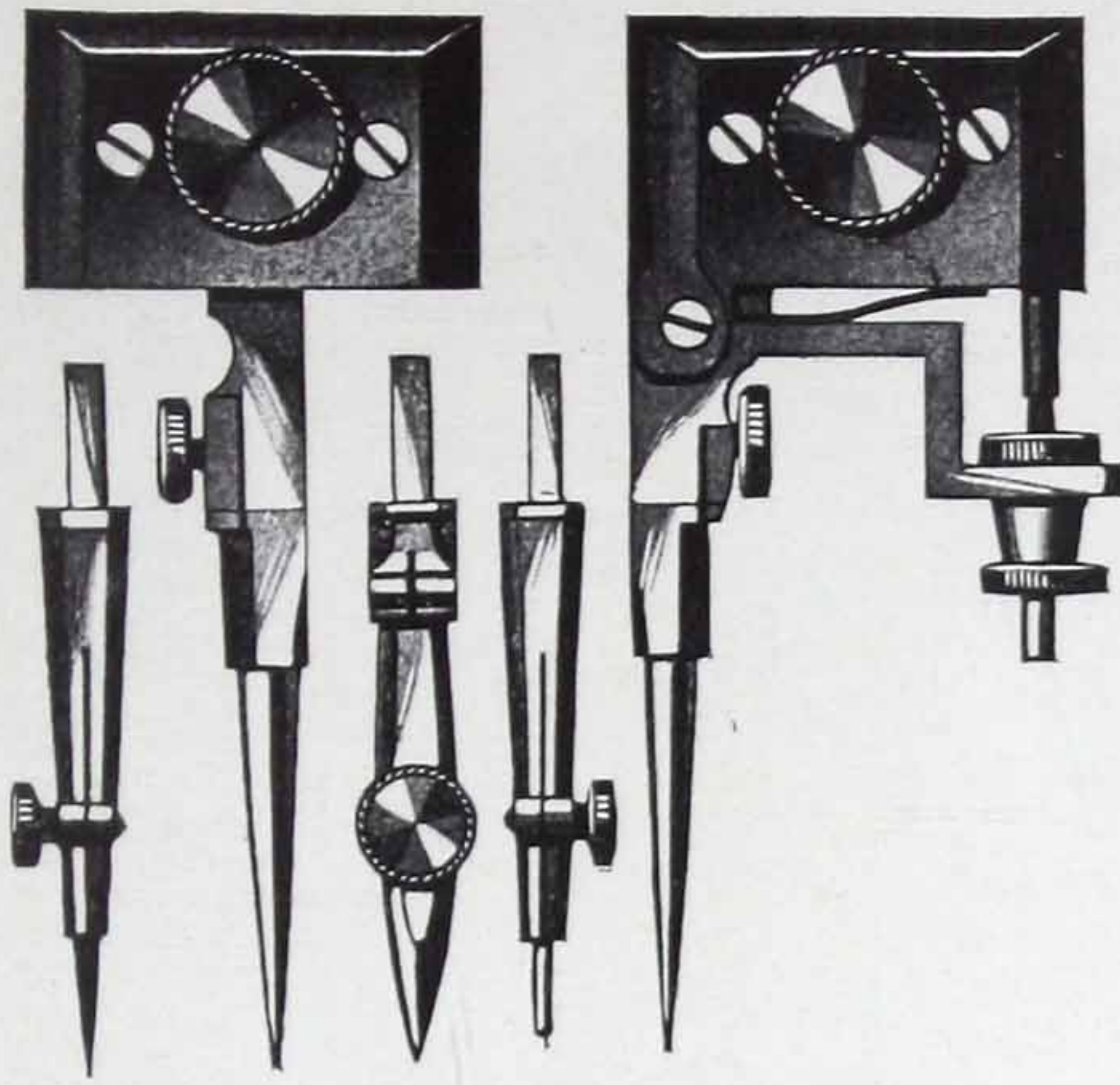
No. 1493C



No. 1494C

- No. 1491C.** Zenith Proportional Dividers, 8 in., finely divided for lines, circles, planes and solids. Rack Movement and Adjustable Steel Points, in velvet lined case..... **LASSIE**
- No. 1493C.** Zenith Proportional Dividers, 8 in., same as No. 1491C but with Micrometer Adjustment, in velvet lined case..... **LASSO**
- No. 1494C.** Zenith Proportional Dividers, 10 in., finely divided into 200 equal parts. With complete table of settings for lines, circles, planes and solids. Rack Movement and Adjustable Steel Points, in velvet lined case..... **LASTON**

ZENITH DRAWING INSTRUMENTS



No. 1496C

- No. 1496C.

Zenith Beam Compass with two steel points, pen and pencil parts, vertical micrometer adjustment, in velvet-lined case.....

LATTICE
- No. 1497.

Wheel attachment for Beam Compasses No. 1496....

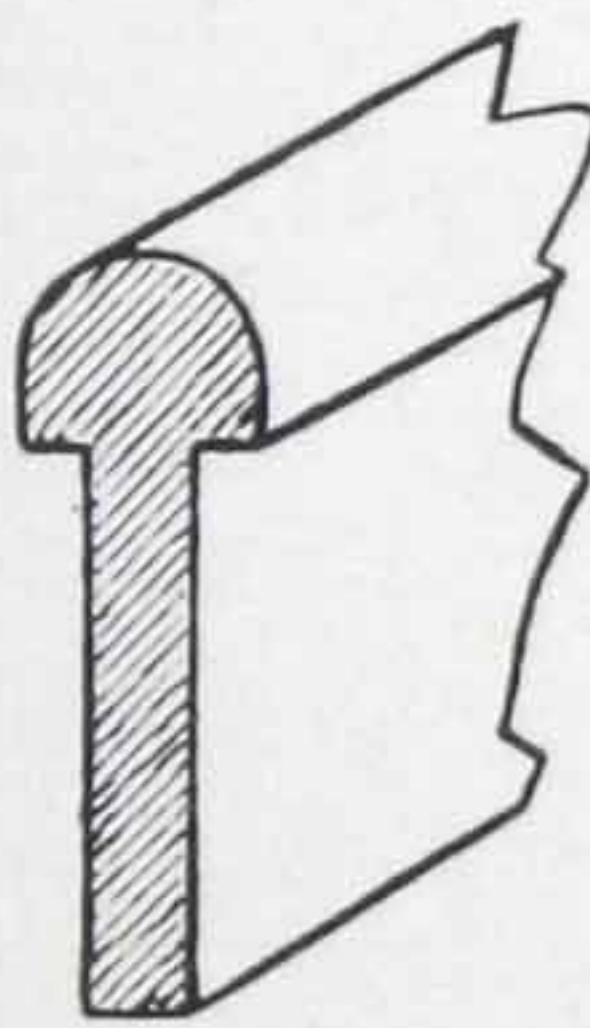
LAUDER
- No. 1498C.

Case only, velvet-lined, to contain Beam Compass No. 1496 and attachment No. 1497.....

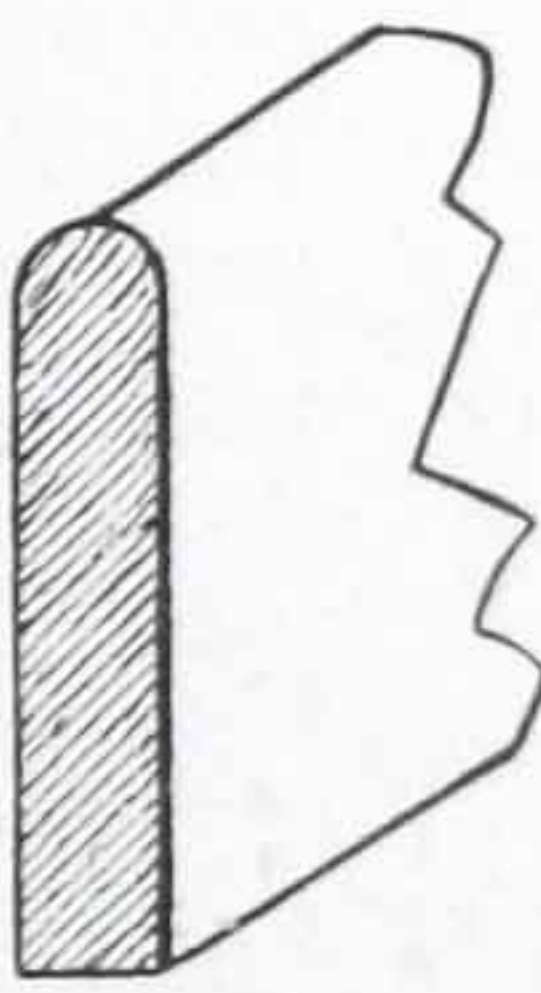
LAUT
- For other Beam Compasses see pages 245-246.

Code Word

BARS FOR BEAM COMPASSES



No. 1499A



No. 1499C

Inches—	24	30	36	42	48	60
No. 1499A. Hardwood. Each.....						
No. 1499C. Hardwood. Each.....						

If possible please state for which instrument beam is intended.

SEE PRICE LIST IN BACK OF CATALOG

ZENITH DRAWING INSTRUMENTS

In Finest Pocket Book Cases.



No. 1504S

No. 1504S. Pocket Book Case, velvet-lined, containing:

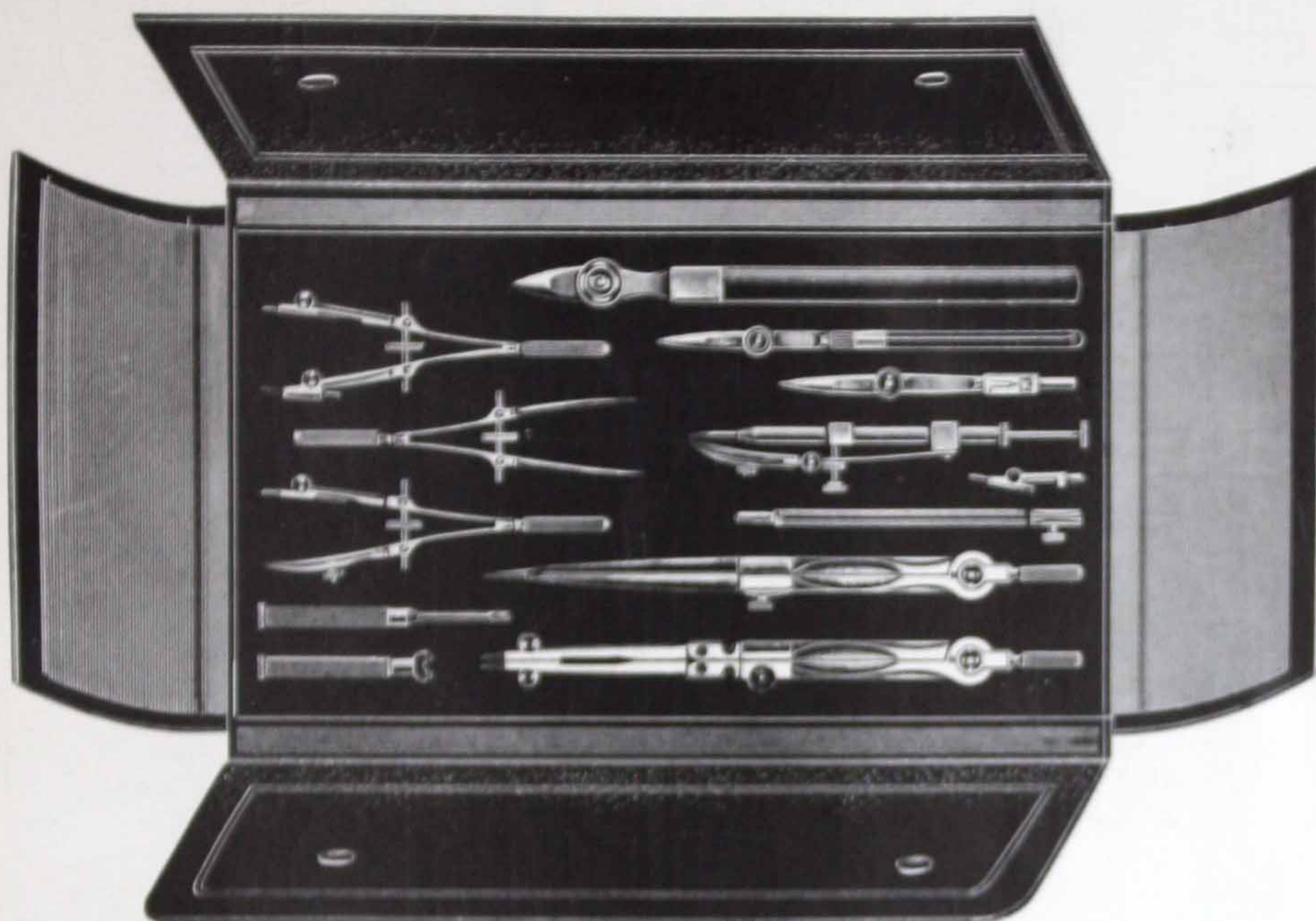
- No. 1400. Ruling Pen, $4\frac{1}{2}$ inch.
- No. 1402. Ruling Pen, $5\frac{1}{2}$ inch.
- No. 1430S. Bow Divider, side adjustment, $3\frac{1}{2}$ inch.
- No. 1432S. Bow Pen, side adjustment, $3\frac{1}{2}$ inch.
- No. 1434S. Bow Pencil, side adjustment, $3\frac{1}{2}$ inch.
- No. 1471. Hairspring Divider, 6 inch.
- No. 1474 $\frac{3}{4}$. Compasses, 6 inch, with fixed needle point, pen and pencil parts and lengthening bar.
- No. 1485-4. Combination Key and Lead Box.
Per Set.....Code Word, **MACROZ**

No. 1505C. Same Set as No. 1504S but with Center Adjustment Bow Instruments
Nos. 1440C, 1442C and 1444C instead of Side Adjustment Bows.
Per Set.....Code Word, **MADCAZ**

SEE PRICE LIST IN BACK OF CATALOG

ZENITH DRAWING INSTRUMENTS

In Finest Pocket Book Cases.



No. 1507C

No. 1506C. Pocket Book Case, velvet-lined, containing:

No. 1400. Ruling Pen, $4\frac{1}{2}$ inch.

No. 1411. Detail Pen, 6 inch.

No. 1440C. Bow Divider, Center Adjustment, $3\frac{1}{2}$ inch.

No. 1442C. Bow Pen, Center Adjustment, $3\frac{1}{2}$ inch.

No. 1444C. Bow Pencil, Center Adjustment, $3\frac{1}{2}$ inch.

No. 1471. Hairspring Divider, 6 inch.

No. 1474 $\frac{3}{4}$. Compasses, 6 inch, with fixed needle point, pen and pencil parts and lengthening bar.

No. 1485-4. Combination Key and Lead Box.

Per Set.....Code Word, **MADHAZE**

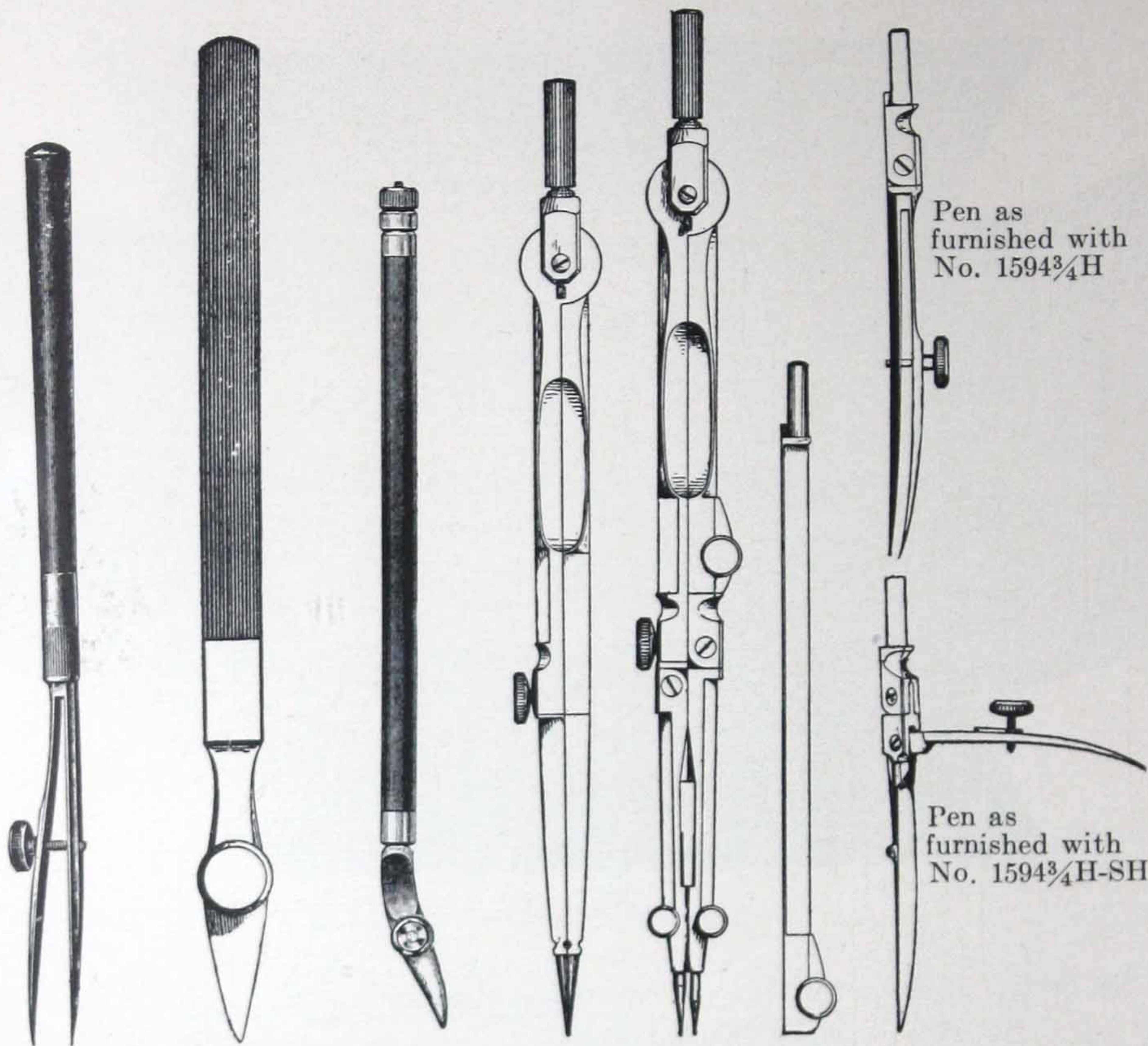
No. 1507C. Same Set as No. 1506C but with No. 1467 Drop Spring Bow Pen with Pencil Part.

Per Set.....Code Word, **MADLIZ**

SEE PRICE LIST IN BACK OF CATALOG

ALTENEDER'S DRAWING INSTRUMENTS

Each instrument is stamped T. A. or T. A. & Sons



No. 1551

No. 1561

No. 1564

No. 1591

No. 1594³/₄H and
No. 1594³/₄H-SH

Code Word

No. 1550. Ruling Pen, 4¹/₄ in., upper blade with spring, ebony handle.....

MALAGA

No. 1551. Ruling Pen, 5 in., upper blade with spring, ebony handle.....

MALAISE

No. 1552. Ruling Pen, 5¹/₂ in., upper blade with spring, ebony handle.....

MALAPERT

No. 1560. Swedish Ruling Pen, 5 in., ebony handle.....

MALAR

No. 1561. Swedish Ruling Pen, 6 in., ebony handle.....

MALAY

No. 1562. Swedish Ruling Pen, 7 in., ebony handle.....

MALBER

No. 1564. Curve Pen, 4³/₄ in., hollow metal handle.....

MALIC

No. 1591. Hairspring Divider, 5 in.....

MALINGER

No. 1594³/₄H. Compass, 5¹/₂ in., Hairspring, with fixed needle point (leg), pen and pencil parts and lengthening bar.....

MALISON

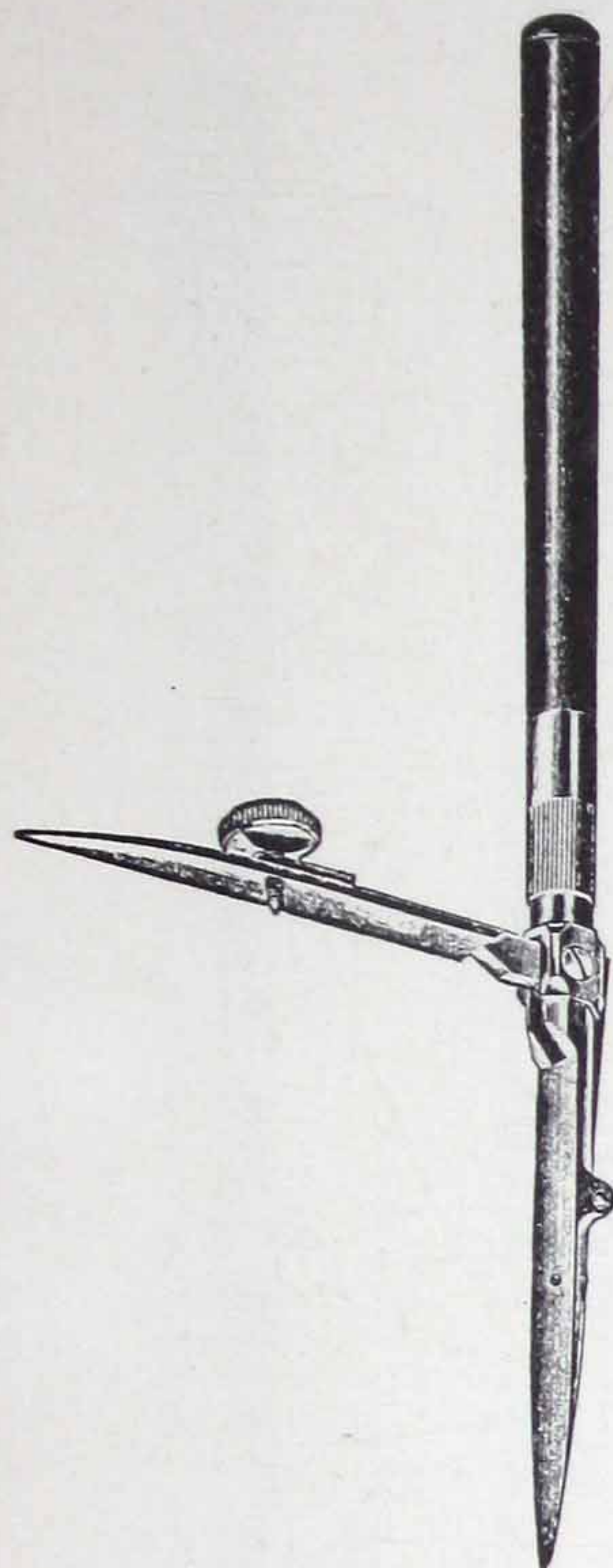
No. 1594³/₄H-SH. Same as No. 1594³/₄H, but with Patent Spring Hinge Pen.....

MALLARD

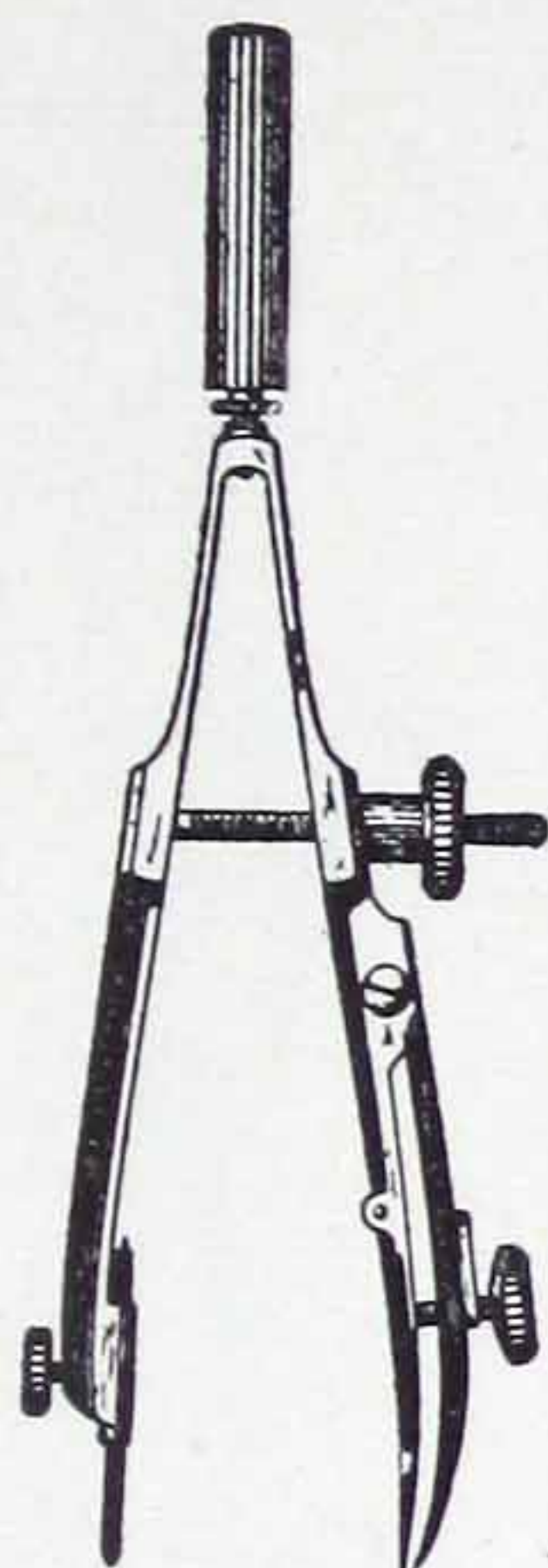
SEE PRICE LIST IN BACK OF CATALOG

ALTENER'S DRAWING INSTRUMENTS

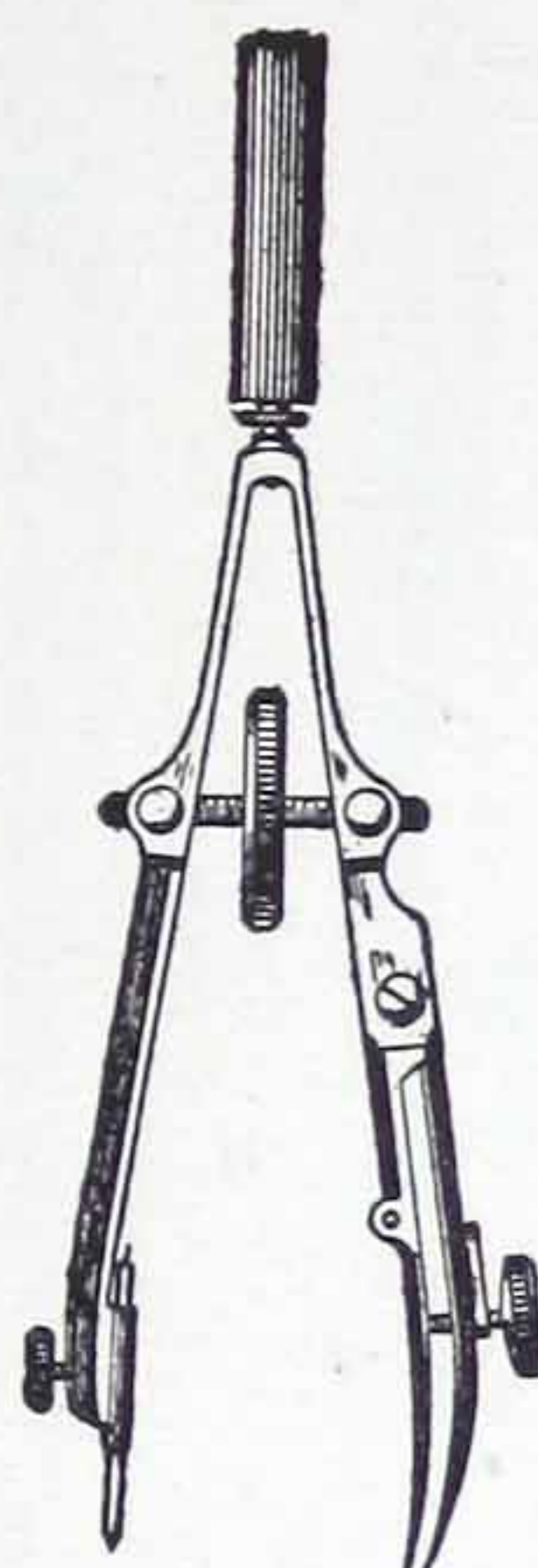
Each instrument is stamped T. A. or T. A. & Sons



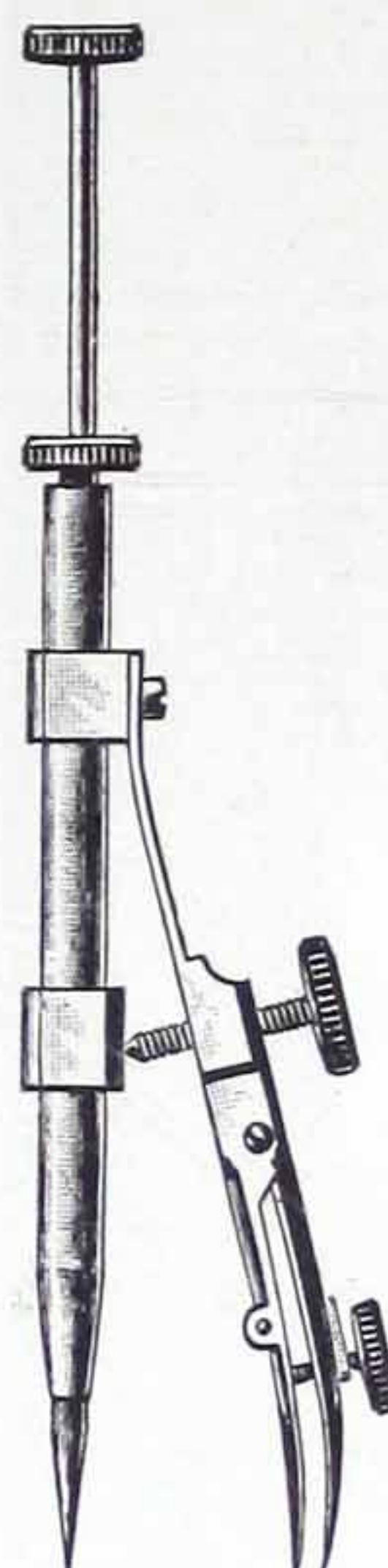
No. 1557SH



No. 1572SH



No. 1582SH



No. 1586SH

		Code Word
No. 1556SH.	Spring Hinge Ruling Pen, 4¼ in., ebony handle.....	MALTINE
No. 1557SH.	Spring Hinge Ruling Pen, 5 in., ebony handle.....	MALTOSE
No. 1558SH.	Spring Hinge Ruling Pen, 5½ in., ebony handle.....	MAMMON
No. 1556A-SH.	Spring Hinge Ruling Pen, 4¼ in., aluminum handle.....	MAMMOTH
No. 1557A-SH.	Spring Hinge Ruling Pen, 5 in., aluminum handle.....	MANACLE
No. 1558A-SH.	Spring Hinge Ruling Pen, 5½ in., aluminum handle.....	MANAKIN
No. 1571.	Steel Spring Bow Divider with needle points, German silver handle, 3¼ in.....	MANNATEE
No. 1572SH.	Steel Spring Bow Pen with spring hinge, German silver handle, 3¼ in.....	MANDARIN
No. 1574.	Steel Spring Bow Pencil, German silver handle, 3¼ in.....	MANDATE
No. 1581.	Steel Spring Bow Divider, center motion, with needle points, German silver handle, 3¼ in.....	MANDOLIN
No. 1582SH.	Steel Spring Bow Pen, center motion, with spring hinge, German silver handle, 3¼ in.....	MANDREL
No. 1584.	Steel Spring Bow Pencil, center motion, German silver handle, 3¼ in.....	MANGER
No. 1586SH.	Rotating Drop Bow Pen with spring hinge, 4 in.....	MANIS
No. 1587SH.	Rotating Drop Bow Instrument, like No. 1586SH but with pencil part.....	MANOR

SEE PRICE LIST IN BACK OF CATALOG

PEERLESS DRAWING INSTRUMENTS



No. 1600

No. 1601

No. 1602

No. 1601C

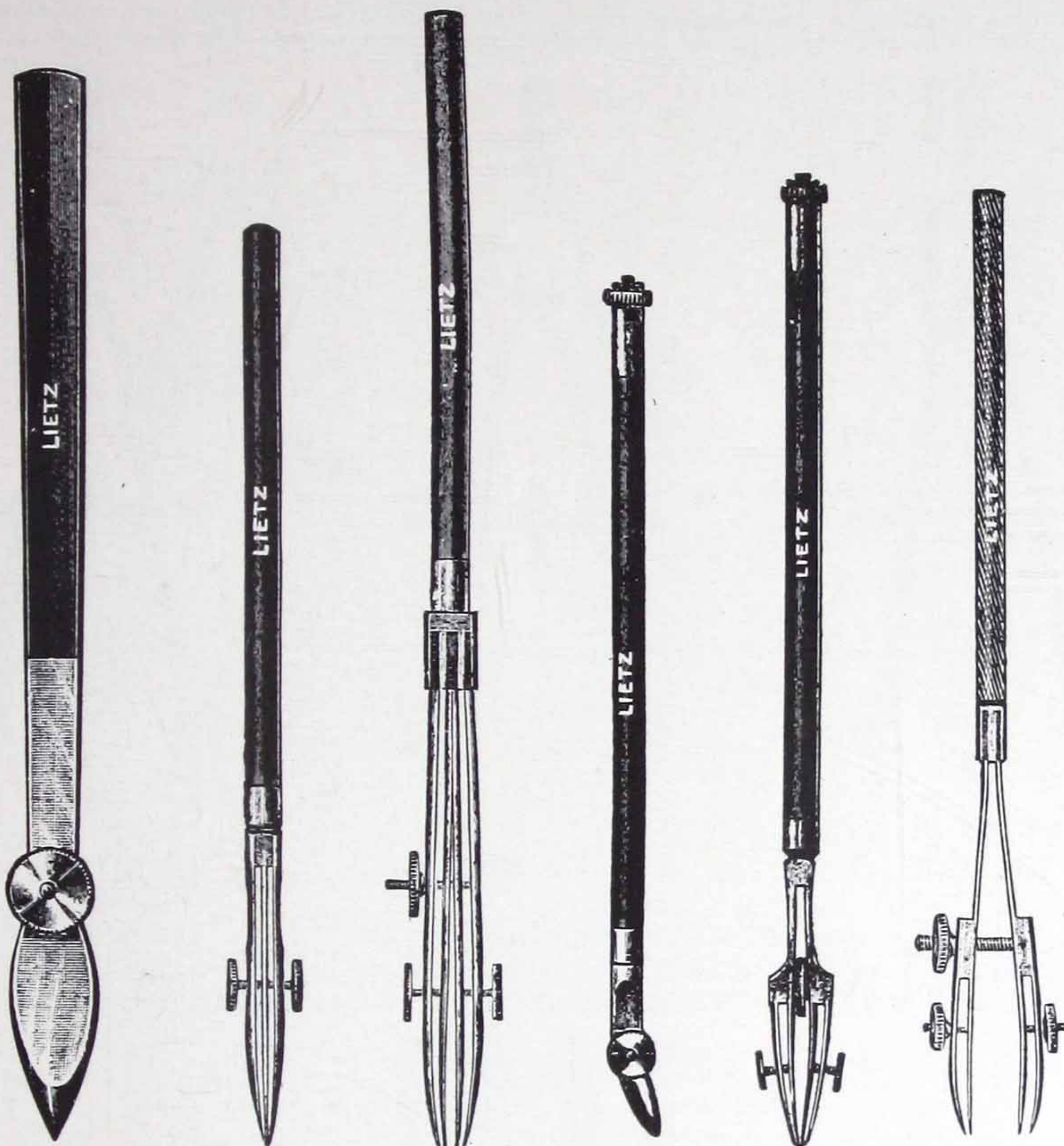
No. 1604

No. 1608

- | | | |
|--|--|---------------|
| | | Code Word |
| No. 1600. | Ruling Pen, spring blade, metal handle, 4½ inch. | MIAD |
| No. 1601. | Ruling Pen, spring blade, metal handle, 5 inch. | MIARE |
| No. 1602. | Ruling Pen, spring blade, metal handle, 5½ inch. | MIATER |
| No. 1601C. | Ruling Pen with cross joint, metal handle, 5 inch. | MIBEE |
| The cross joint is a simple construction for rapidly opening and cleaning the pen. Maintains adjustment for width of lines without altering. | | |
| No. 1604. | Ruling Pen with graduated thumbscrew, metal handle, 5½ inch. | MIBERT |
| The thumbscrews on Pens No. 1604 are divided into 20 divisions, each alternate one marked with figure. One whole turn equals 1 m/m of width of line. The best arrangement for readjusting to width of line after cleaning. | | |
| No. 1608. | Ruling Pen for fine lines, metal handle, 5 inch. | MIBETH |
| Pens No. 1608 are excellent for very fine line work. Easily sharpened by merely grinding the slant. | | |

SEE PRICE LIST IN BACK OF CATALOG

PEERLESS DRAWING INSTRUMENTS



No. 1612

No. 1633

No. 1633D

No. 1634

No. 1635

No. 1637

Code Word

No. 1612. Detail Pen, broad spoon shape, metal handle, 6 inch. **MIBIRK**

No. 1633. Three-nib Ruling Pen for heavy lines, 5 inch. **MIBO**

No. 1633D. Border Pen, metal handle, 6 inch. **MIBOST**

To draw at one stroke either a very heavy line or two lines of equal or different thicknesses.

No. 1634. *Contour Pen, metal handle, $4\frac{3}{4}$ inch. **MICO**

No. 1635. *Double Curve Pen, center adjustment, $5\frac{1}{4}$ inch. **MICRA**

No. 1637. Railroad Pen, metal handle, $5\frac{1}{4}$ inch. **MICROSE**

*Pens Nos. 1634 and 1635 are fastened to a rod which swivels in the hollow handle and thus follows the smallest curve with precision. The rod may be locked by means of a nut at the upper end, and the instrument may be used as an ordinary drawing or railroad pen.

SEE PRICE LIST IN BACK OF CATALOG

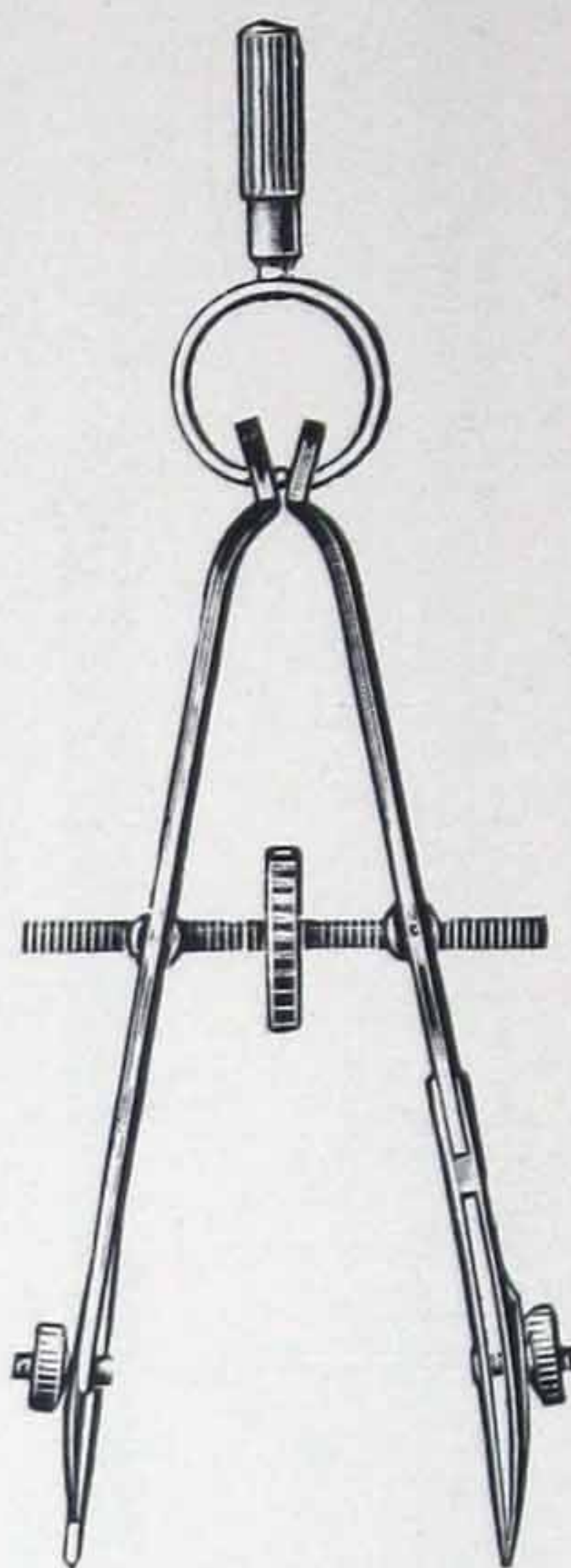
PEERLESS DRAWING INSTRUMENTS

ANNULAR SPRING BOW INSTRUMENTS

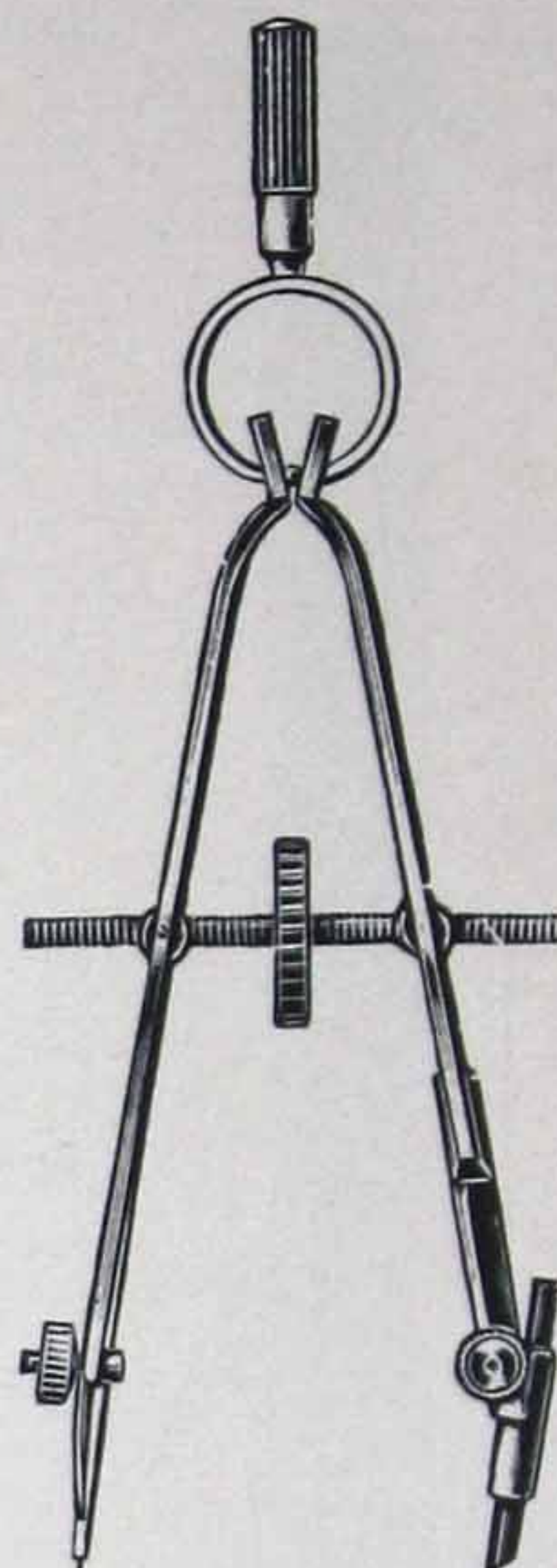
The great advantage of instruments of this construction lies in the annular spring which keeps the shanks of the instruments always at the same tension, no matter how large or small the opening.



No. 1661

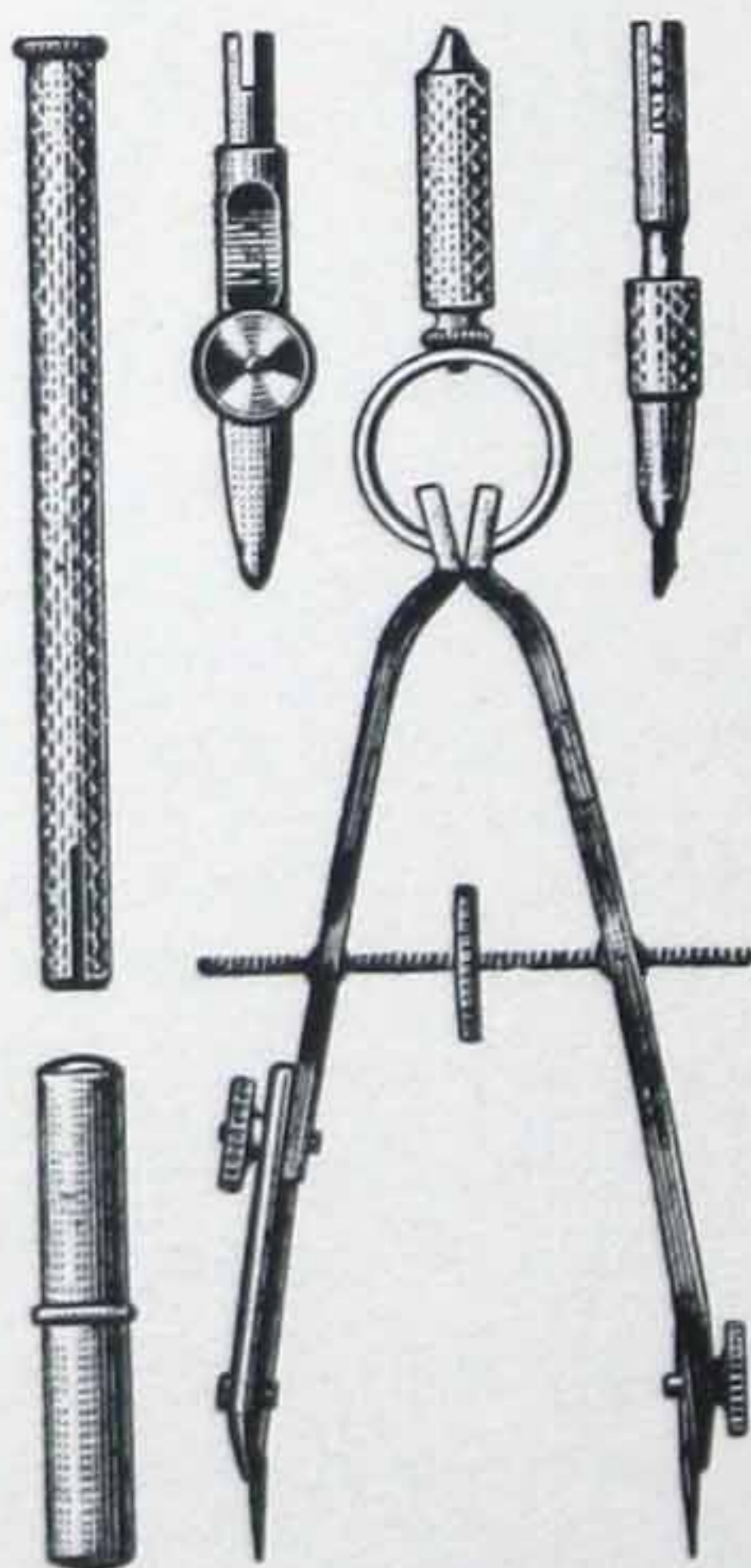


No. 1662



No. 1664

- | | | |
|-----------|---|----------------------------|
| No. 1661. | Annular Spring Bow Divider, center adjustment, $4\frac{1}{4}$ inch..... | Code Word
MIDBIN |
| No. 1662. | Annular Spring Bow Pen, center adjustment, $4\frac{1}{4}$ inch..... | MIDSHIP |
| No. 1664. | Annular Spring Bow Pencil, center adjustment, $4\frac{1}{4}$ inch..... | MIDTON |

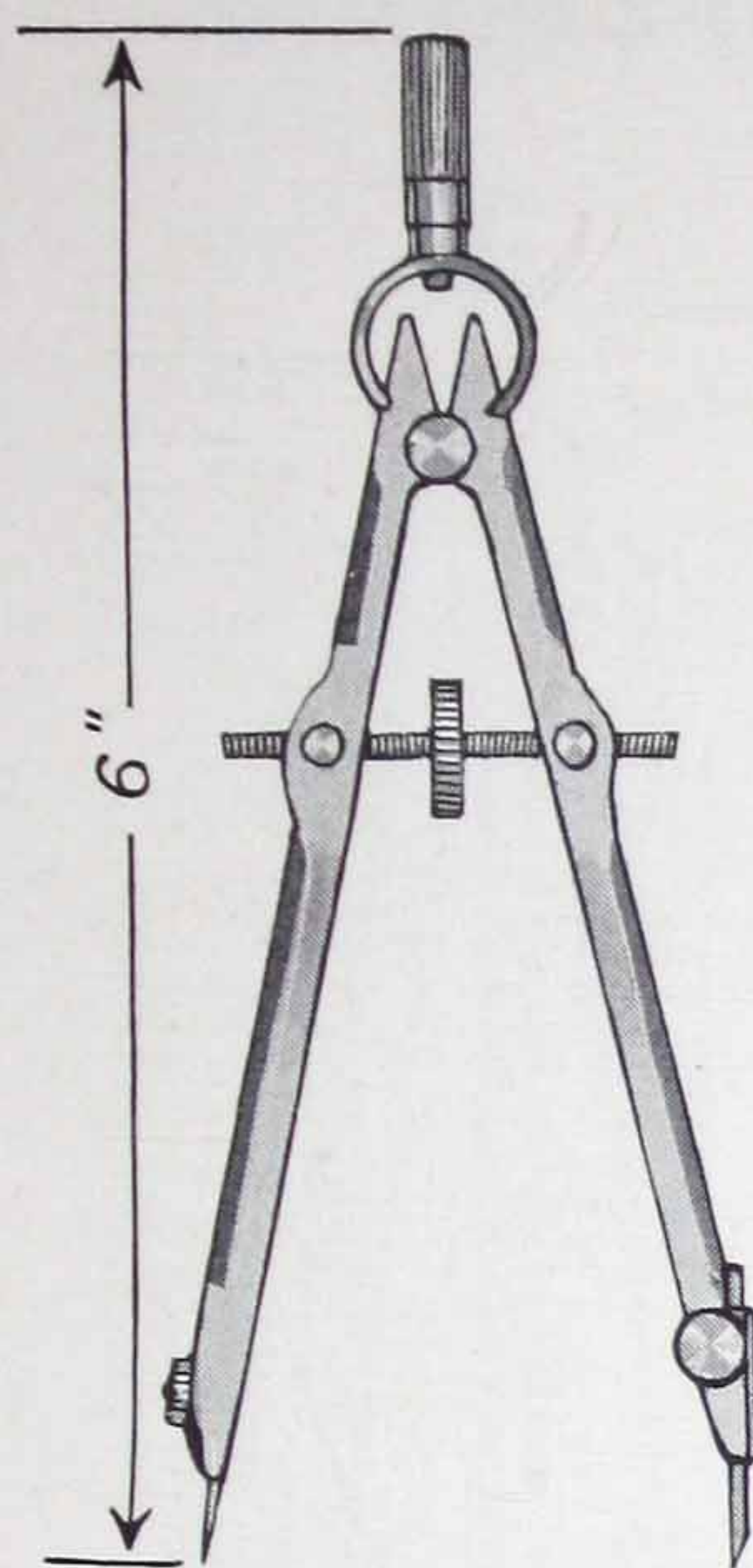


No. 1665C

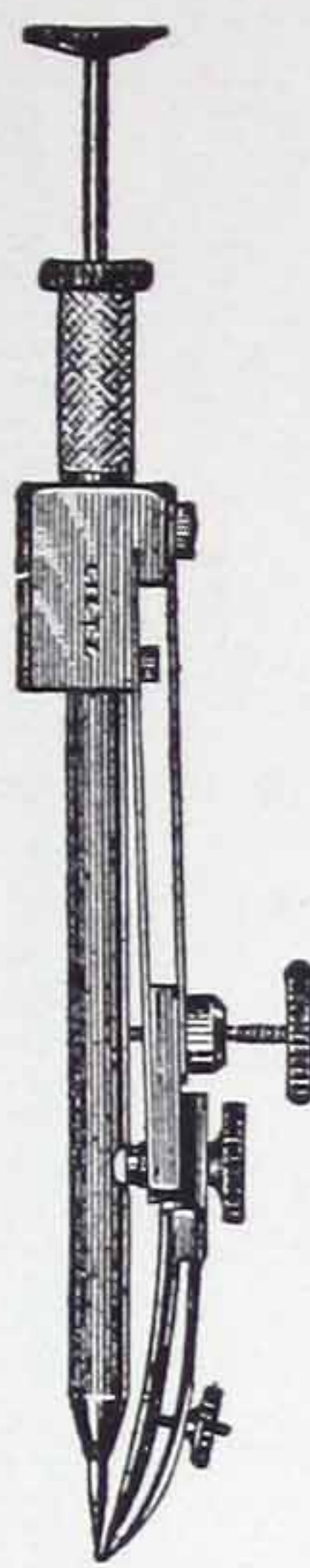
- | | | |
|------------|--|----------------------------|
| No. 1665C. | Annular Spring Bow Instrument, center adjustment, $4\frac{1}{4}$ inch, with pen and pencil points, lead box and metal handle, in silk velvet-lined case... | Code Word
MIDWIN |
|------------|--|----------------------------|

SEE PRICE LIST IN BACK OF CATALOG

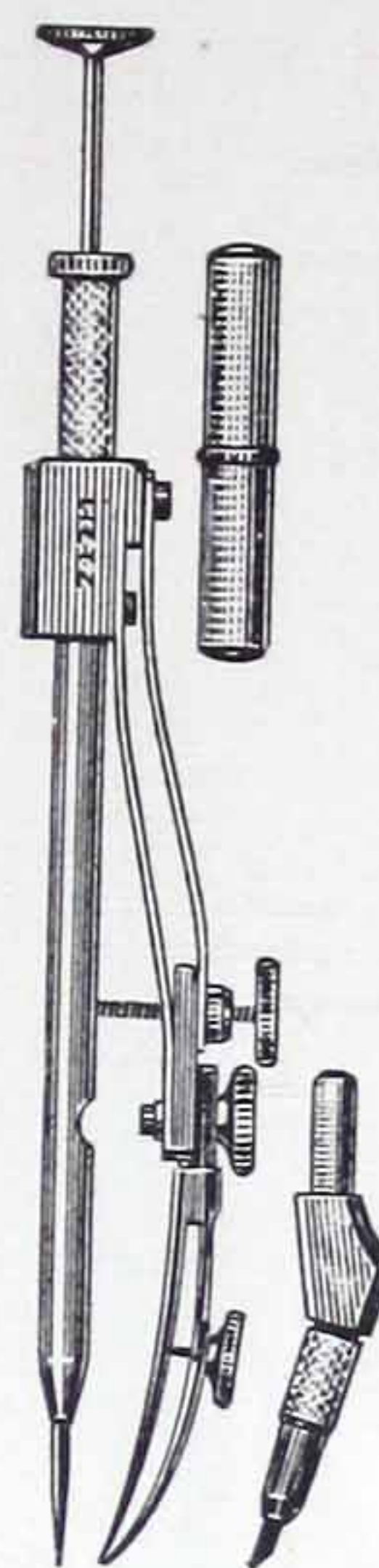
PEERLESS DRAWING INSTRUMENTS



No. 1666



No. 1668



No. 1669

EXTRA LARGE BOW INSTRUMENTS

Bow Instruments Nos. 1666 and 1667C are 6 inches in size. Suitable for small circles and light work yet sturdy enough to draw circles up to 8 inches with accuracy.

- | | |
|---|--------------|
| | Code Word |
| No. 1666. Large Bow Pencil, German Silver with steel spring and center adjustment, 6 inch..... | MIFAD |
| No. 1667C. Large Combination Bow Instrument with pen and pencil part, 6 inch, in barlock case..... | MIGA |

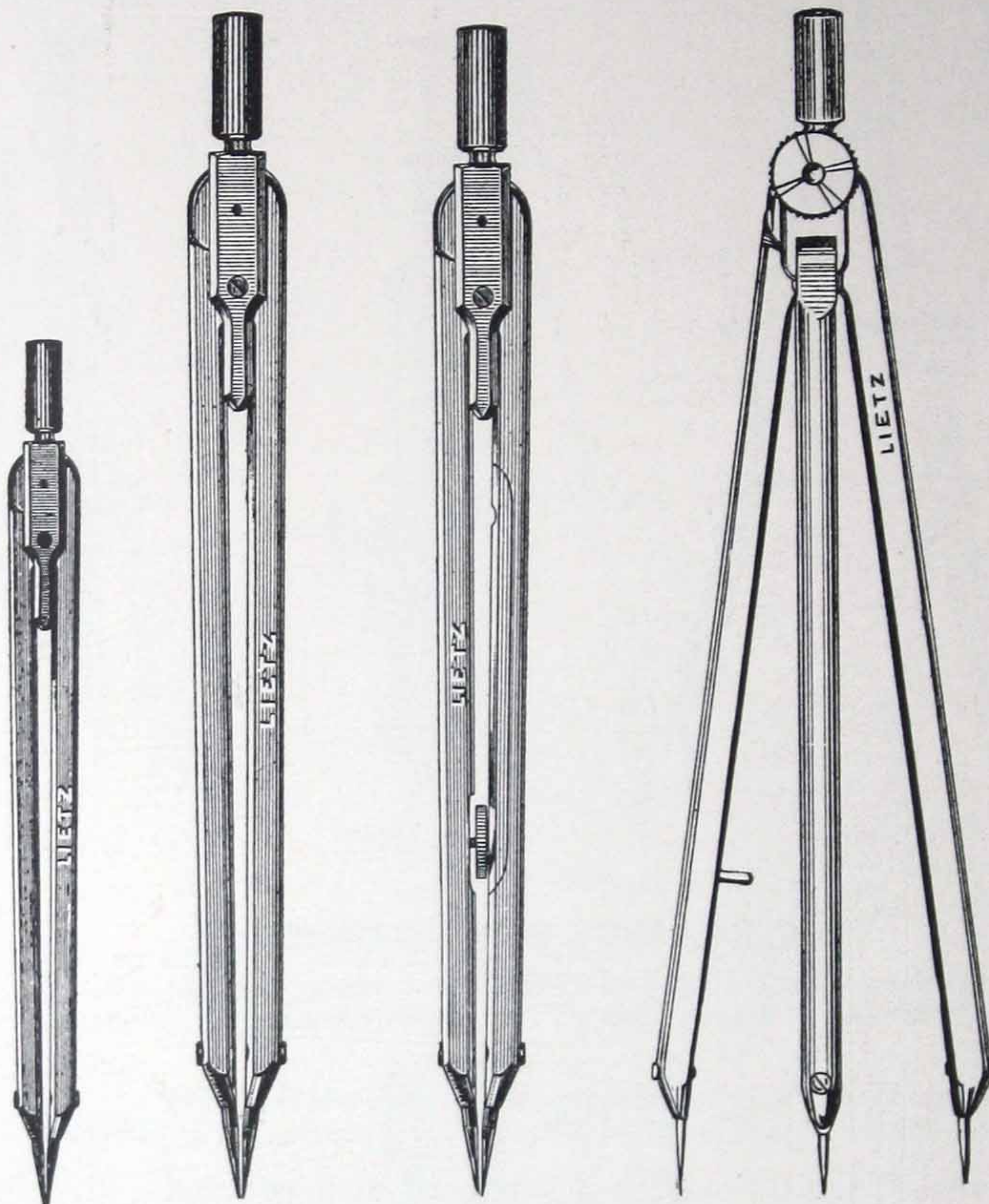
IMPROVED ROTATING BOW PENS

In Rotating Compasses Nos. 1668 and 1669 the introduction of a two-spring arrangement forces the pen point to remain parallel to the center point; the angle to the drawing surface being constant, no matter what the size of the circle may be.

- | | |
|--|----------------|
| | Code Word |
| No. 1668. Rotating Drop Bow Pen with double spring, 4½ in... | MIGNAR |
| No. 1668C. Same as No. 1668, in velvet-lined case..... | MIGNON |
| No. 1669. Rotating Drop Bow Instrument like No. 1668, but with pencil part..... | MIGRANT |
| No. 1669C. Same as No. 1669, in velvet-lined case..... | MIGRAVE |

SEE PRICE LIST IN BACK OF CATALOG

PEERLESS DRAWING INSTRUMENTS

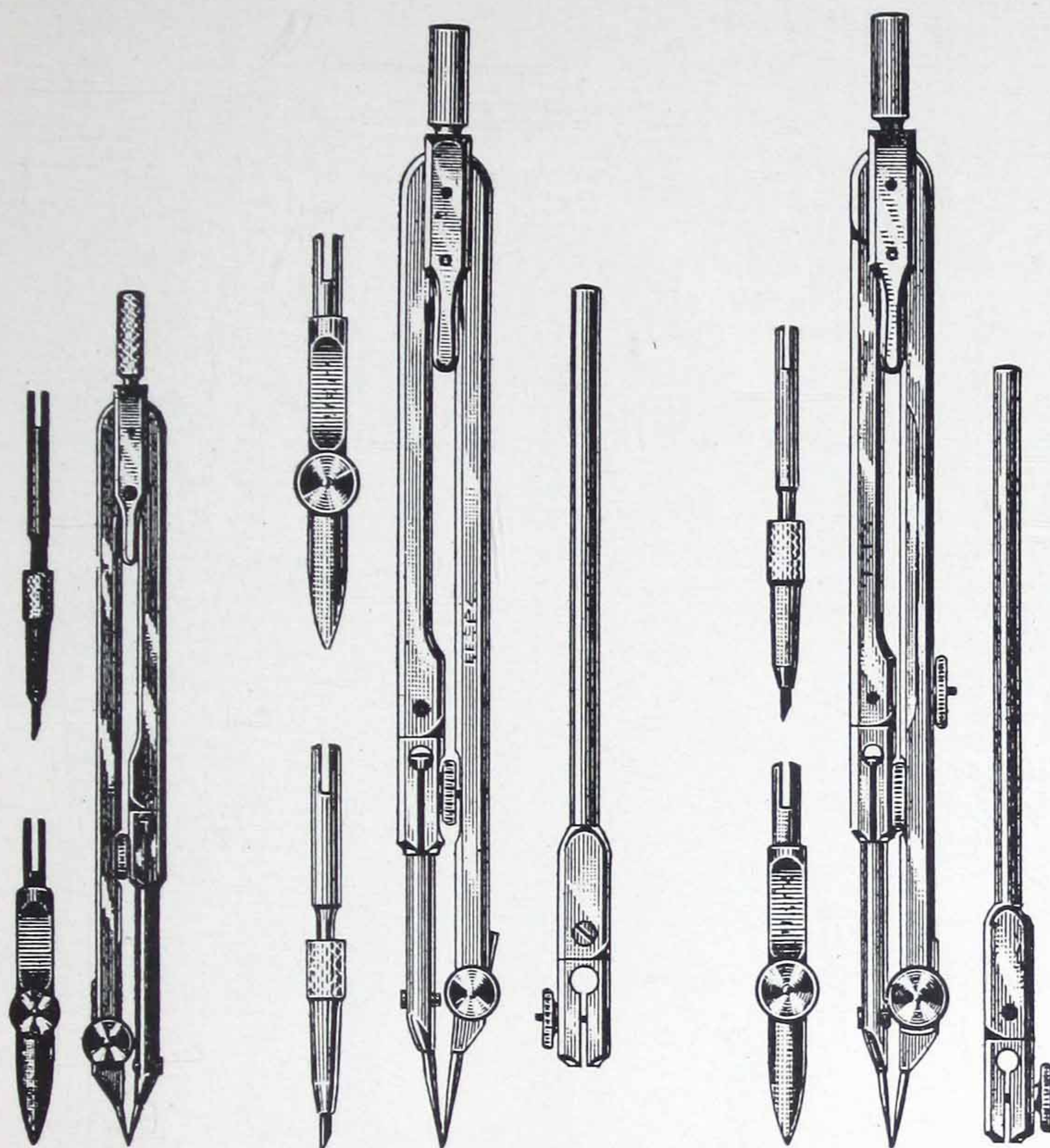


No. 1680-1 No. 1680-2 No. 1681-2 No. 1680-3L

		Code Word
No. 1680-1.	Plain Dividers, 4 in., with replaceable steel points.....	MILDEN
No. 1680-2.	Plain Dividers, 6 in., with replaceable steel points.....	MILDRED
No. 1681-2.	Hairspring Dividers, 6 in., with replaceable steel points.....	MILEPOST
No. 1680-3L.	Three-legged Dividers with replaceable steel points, for transferring to scale, $5\frac{3}{4}$ in.....	MILESTONE
All Dividers equipped with straightening device.		

SEE PRICE LIST IN BACK OF CATALOG

PEERLESS DRAWING INSTRUMENTS



No. 1682NL

No. 1684

No. 1684H

Code Word

- No. 1682NL.** Compasses, 4 inch, with replaceable needle points, divider, pen and pencil parts and lengthening bar. . . **MILITIA**
- No. 1684.** Compasses, 6 inch, with replaceable needle points, divider, pen and pencil parts and lengthening bar. . . **MILLWHEEL**
- No. 1684X.** Same as No. 1684 but with extra lengthening bar 9 inches long in addition to the regular lengthening bar. **MILLWIT**
- No. 1684H.** Compasses, 6 inch, with replaceable needle points, divider, pen and pencil parts and lengthening bar. . . **MILLET**

All Compasses equipped with straightening device.

SEE PRICE LIST IN BACK OF CATALOG

EXTRA PARTS FOR PEERLESS DRAWING INSTRUMENTS

For Ruling Pens

- No. 1685A. Screw or bolt and nut for pens.....
B. Slide Catch Device for pens.....
C. Handles for Pens, Ebony or Aluminum.....

For Bow Instruments

- No. 1685D. Adjusting nut for side screw type (nut only).....
E. Bolt or spindle for side screw type (without nut).....
F. Center Wheel Assembly, complete.....
G. Clamp Nuts and Bolts for Needle Points.....
H. Clamp Screws for Pencil Points.....
I. Screw or bolt and nut for Pen Points.....
J. German Silver Handle for Bow Instruments.....

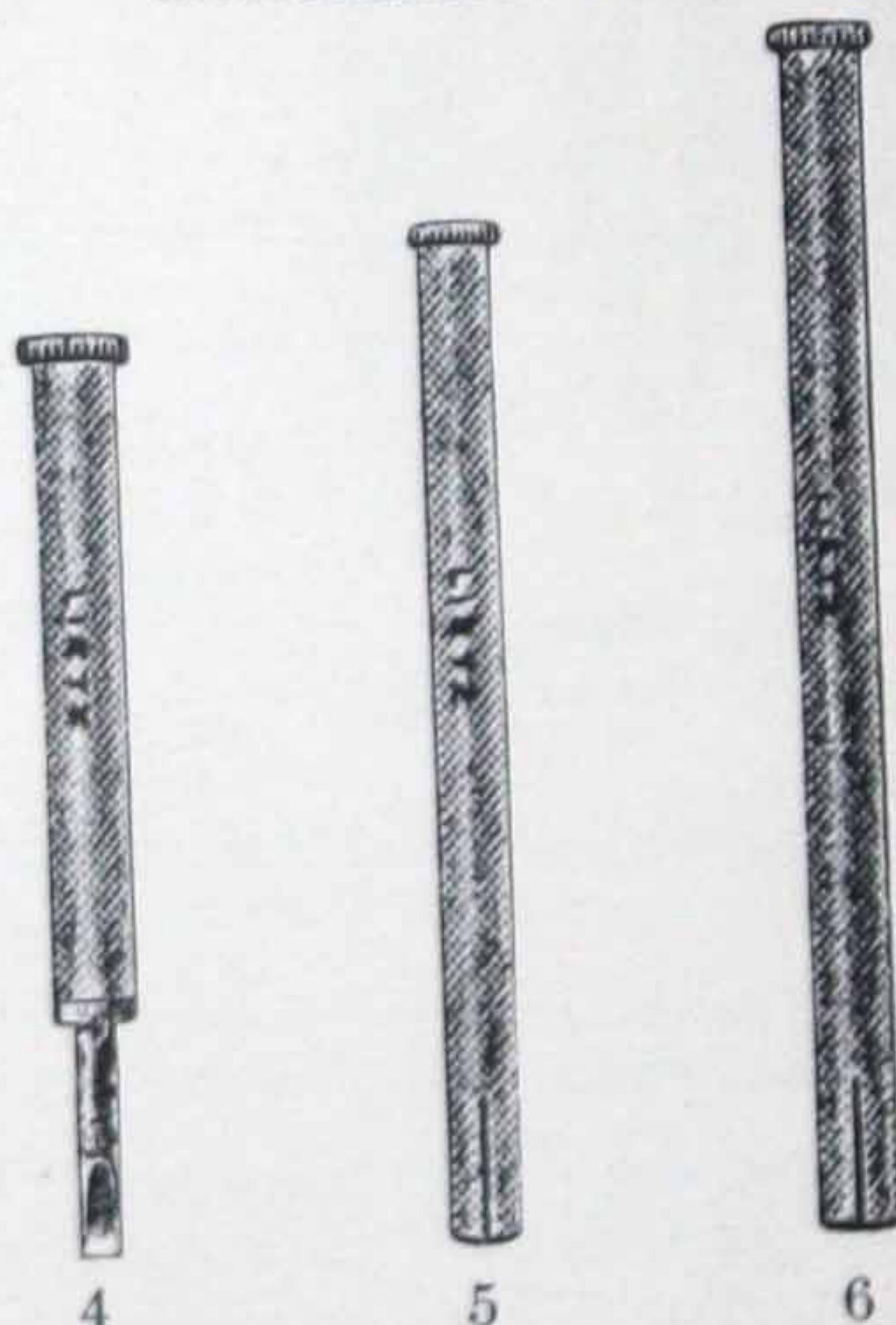
For Dividers

- No. 1685K. Nut and Bolt for hairspring adjustment.....
L. Clamp Nuts and Bolts for Needle Points.....

For Compasses

- No. 1685M. Clamp Screws to hold Pen or Pencil Parts.....
N. Clamp Screws to hold Needle or Lead.....
O. Screw or bolt and nut for pens.....
P. Headscrews for Compasses.....
Q. Straightening Device for Compasses.....
R. German Silver Handle for Compasses.....
S. Pencil Part, complete.....
T. Pen Part, complete.....
U. Lengthening Bar, complete.....
W. Divider Part, complete.....

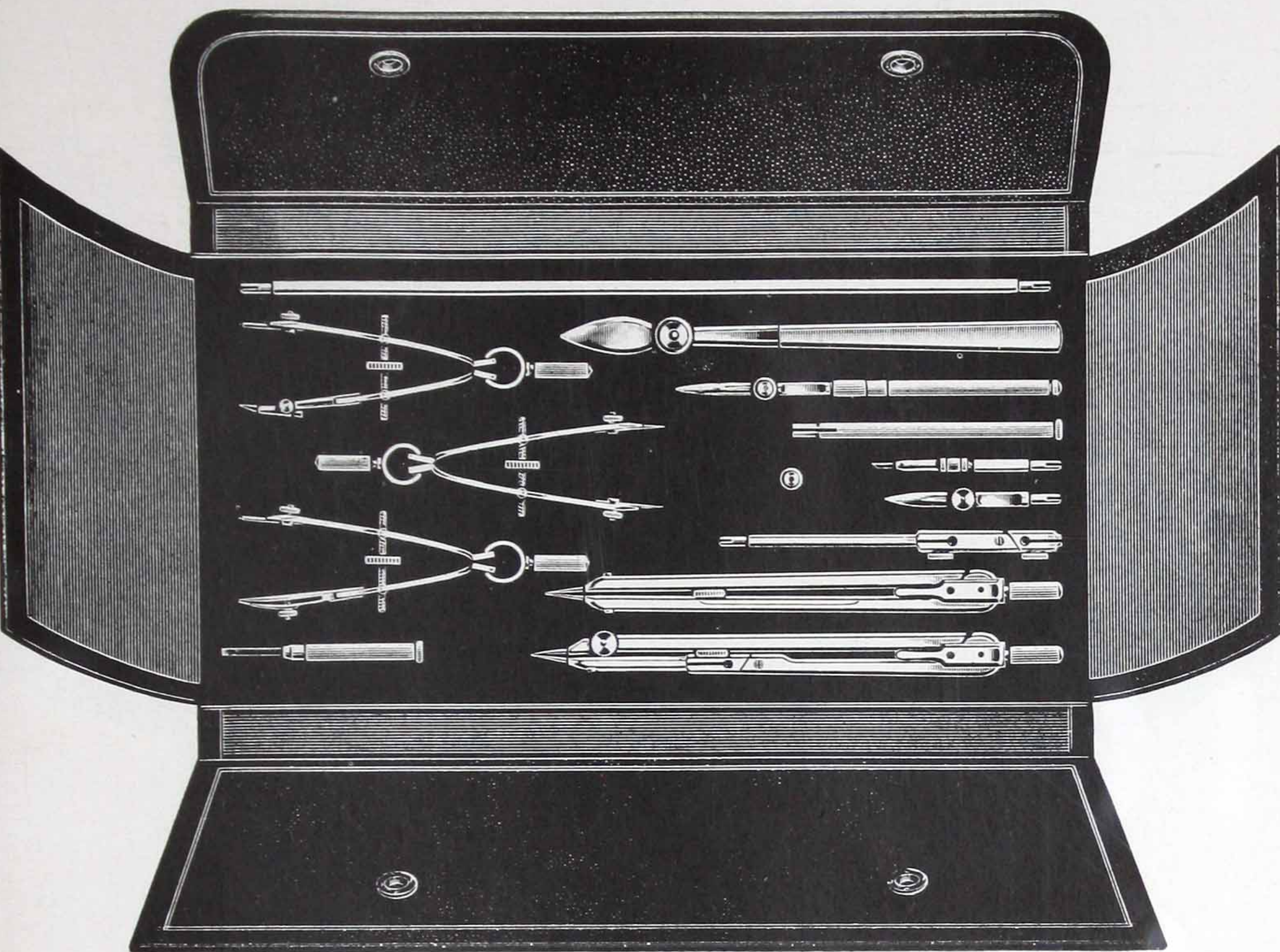
Miscellaneous Parts



No. 1685.

- Part No. 4 Combination Key and Leadbox.....
5 Metal Handle, 2½ in., holding four needle points.....
6 Metal Handle, 3 in., holding four needle points.....
These handles fit the pen, pencil and needle parts of Compasses,
any one of which can, in connection with the handle, be used
as a separate instrument.
7 Center Tack, avoids the disagreeable enlarging of centers in
paper.....

PEERLESS DRAWING INSTRUMENTS



No. 1720C

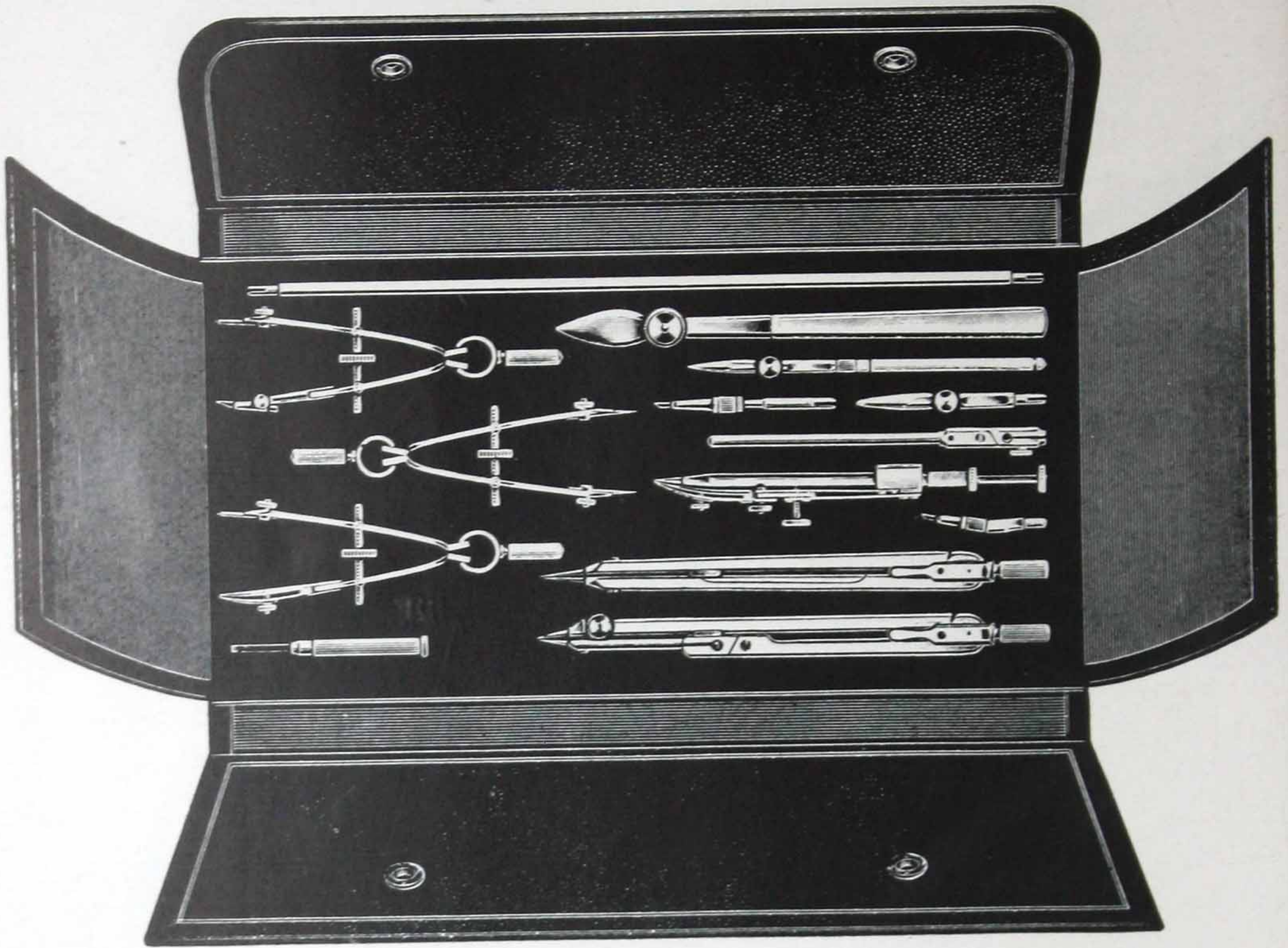
No. 1720C. Pocket Book Case, velvet-lined, containing:

- No. 1601.** Ruling Pen, 5 inch.
 - No. 1612.** Detail Pen, 6 inch.
 - No. 1661.** Bow Divider, Center Adjustment, $4\frac{1}{4}$ inch.
 - No. 1662.** Bow Pen, Center Adjustment, $4\frac{1}{4}$ inch.
 - No. 1664.** Bow Pencil, Center Adjustment, $4\frac{1}{4}$ inch.
 - No. 1681-2.** Hairspring Divider, 6 inch.
 - No. 1684X.** Compasses, 6 inch, with divider, pen, and pencil parts and two lengthening bars, one of them 9 inches long.
 - No. 1685-4.** Combination Key and Lead Box.
 - No. 1685-7.** Center Tack.
Complete Box of Repair Parts.
- Per Set.....Code Word, **MOLAWN**

SEE PRICE LIST IN BACK OF CATALOG

PEERLESS DRAWING INSTRUMENTS

In Cases



No. 1722C

No. 1722C. Pocket Book Case, velvet-lined, containing:

- No. 1601. Ruling Pen, 5 inch.
- No. 1612. Detail Pen, 6 inch.
- No. 1661. Bow Divider, Center Adjustment, $4\frac{1}{4}$ inch.
- No. 1662. Bow Pen, Center Adjustment, $4\frac{1}{4}$ inch.
- No. 1664. Bow Pencil, Center Adjustment, $4\frac{1}{4}$ inch.
- No. 1681-2. Hairspring Divider, 6 inch.
- No. 1684X. Compasses, 6 inch, with divider, pen and pencil parts and two lengthening bars, one of them 9 inches long.
- No. 1669. Rotating Drop Bow Instrument with pencil part.
- No. 1685-4. Combination Key and Lead Box.
- No. 1685-7. Center Tack.

Complete Box of Repair Parts.
Per Set.....Code Word, **MOLBAX**

SEE PRICE LIST IN BACK OF CATALOG

PEERLESS DRAWING INSTRUMENTS

In Cases



No. 1724S (Old No. 1723-3S)

No. 1724S. Pocket Book Case, velvet-lined, containing:

No. 1601. Ruling Pen, 5 inch.

No. 1730S. Bow Divider, Side Adjustment, $3\frac{1}{2}$ inch.

No. 1732S. Bow Pen, Side Adjustment, $3\frac{1}{2}$ inch.

No. 1734S. Bow Pencil, Side Adjustment, $3\frac{1}{2}$ inch.

No. 1681-2. Hairspring Divider, 6 inch.

No. 1684X. Compasses, 6 inch, with divider, pen and pencil parts and two lengthening bars, one of them 9 inches long.

No. 1685-4. Combination Key and Lead Box.

No. 1685-7. Center Tack.

Complete Box of Repair Parts.

Per Set.....Code Word, **MONOLI**

SEE PRICE LIST IN BACK OF CATALOG

PEERLESS DRAWING INSTRUMENTS

In Cases



No. 1727C

No. 1727C. Pocket Book Case, velvet-lined, containing:

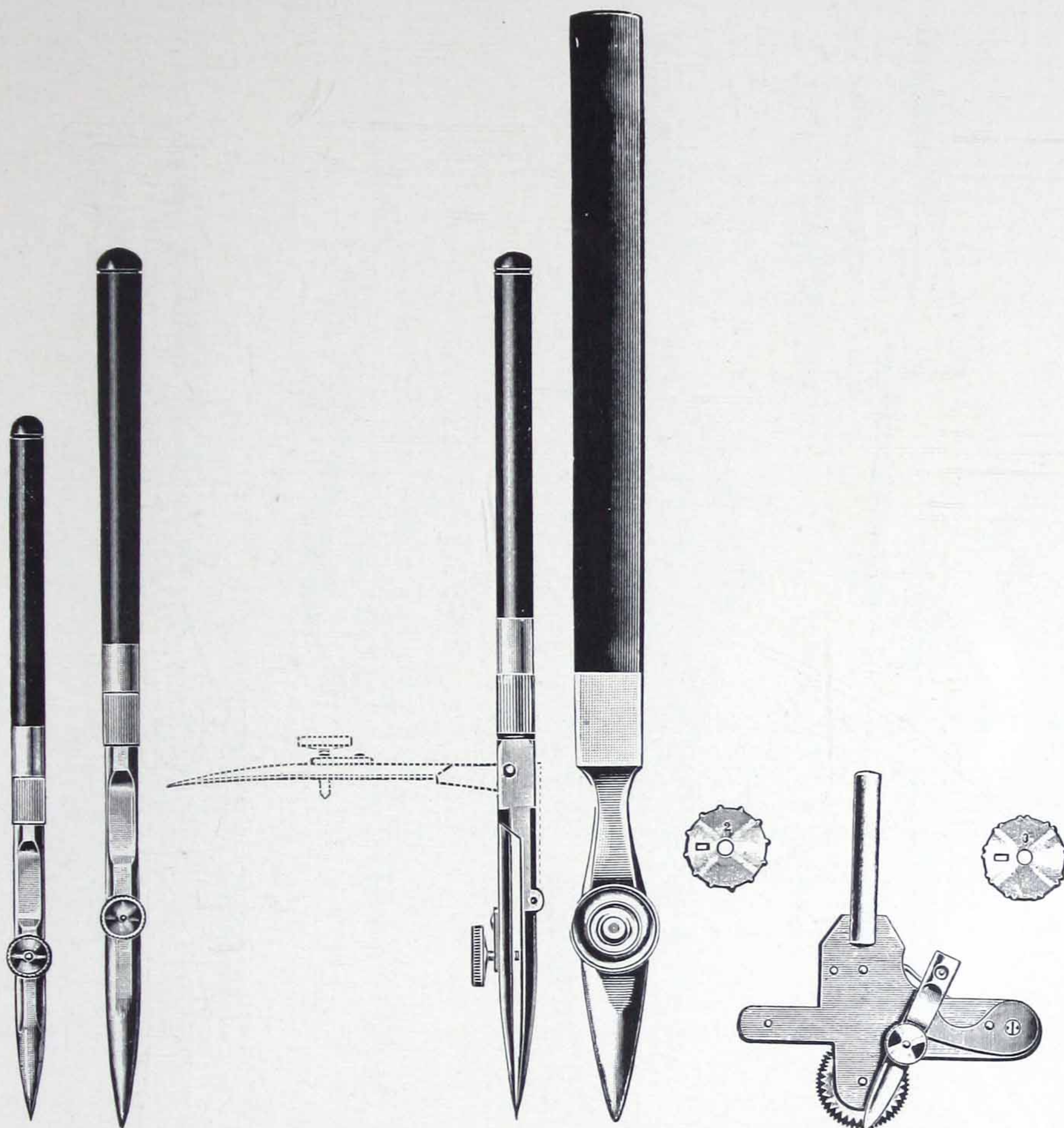
- No. 1601. Ruling Pen, 5 inch.
- No. 1612. Detail Pen, 6 inch.
- No. 1661. Bow Divider, Center Adjustment, $4\frac{1}{4}$ inch.
- No. 1662. Bow Pen, Center Adjustment, $4\frac{1}{4}$ inch.
- No. 1664. Bow Pencil, Center Adjustment, $4\frac{1}{4}$ inch.
- No. 1681-2. Hairspring Divider, 6 inch.
- No. 1684. Compasses, 6 inch, with divider, pen and pencil parts and lengthening bar.
- No. 1634. Contour Pen, $4\frac{3}{4}$ inch.
- No. 1635. Double Curve Pen, $5\frac{1}{4}$ inch.
- No. 1685-4. Combination Key and Lead Box.
- No. 1685-7. Center Tack.

Complete Box of Repair Parts.

Per Set..... Code Word, **MONOLITH**

SEE PRICE LIST IN BACK OF CATALOG

SUPERIOR DRAWING INSTRUMENTS



No. 1700 No. 1702

No. 1705

No. 1711

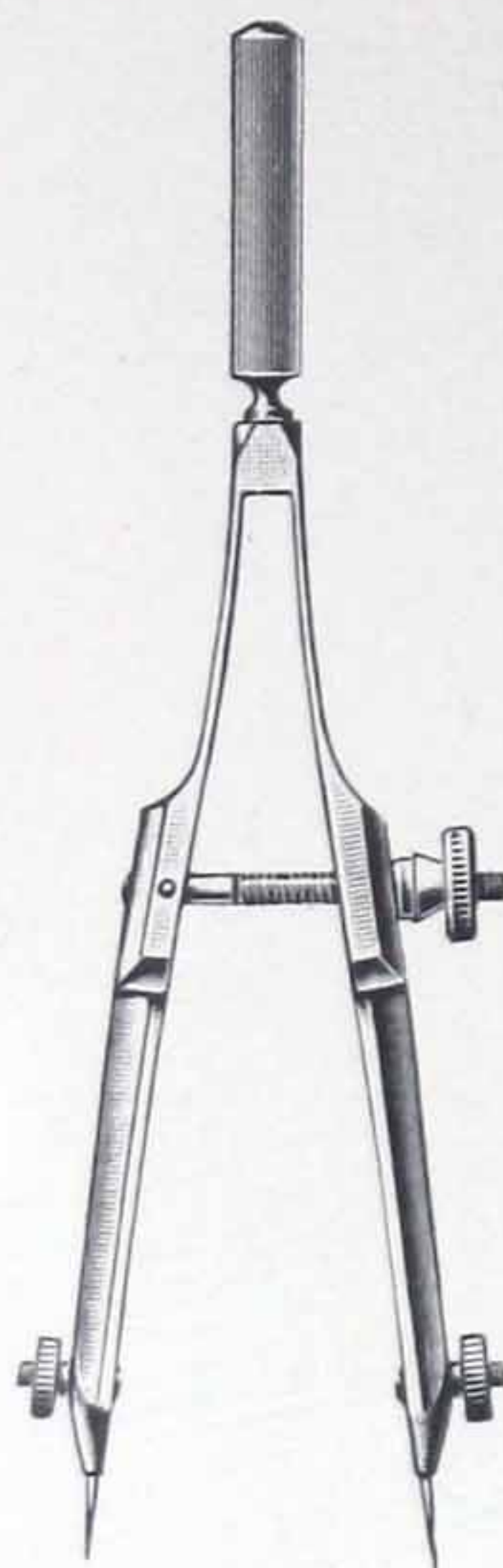
No. 1723

- | | | Code Word |
|------------------|---|----------------|
| No. 1700. | Ruling Pen, Spring Blade, Ebony Handle, 4½ inch.... | MOREDA |
| No. 1702. | Ruling Pen, Spring Blade, Ebony Handle, 5½ inch.... | MOREDIA |
| No. 1703. | Ruling Pen, Knife Spring, Ebony Handle, 4½ inch.... | MOREEN |
| No. 1704. | Ruling Pen, Knife Spring, Ebony Handle, 5 inch..... | MOREL |
| No. 1705. | Ruling Pen, Knife Spring, Ebony Handle, 5½ inch.... | MORELLO |
| No. 1711. | Detail Pen, Spring Blade, 6 inch..... | MORETA |
| No. 1723. | Dotting Instrument for fitting to compass or beam
compass..... | MORION |

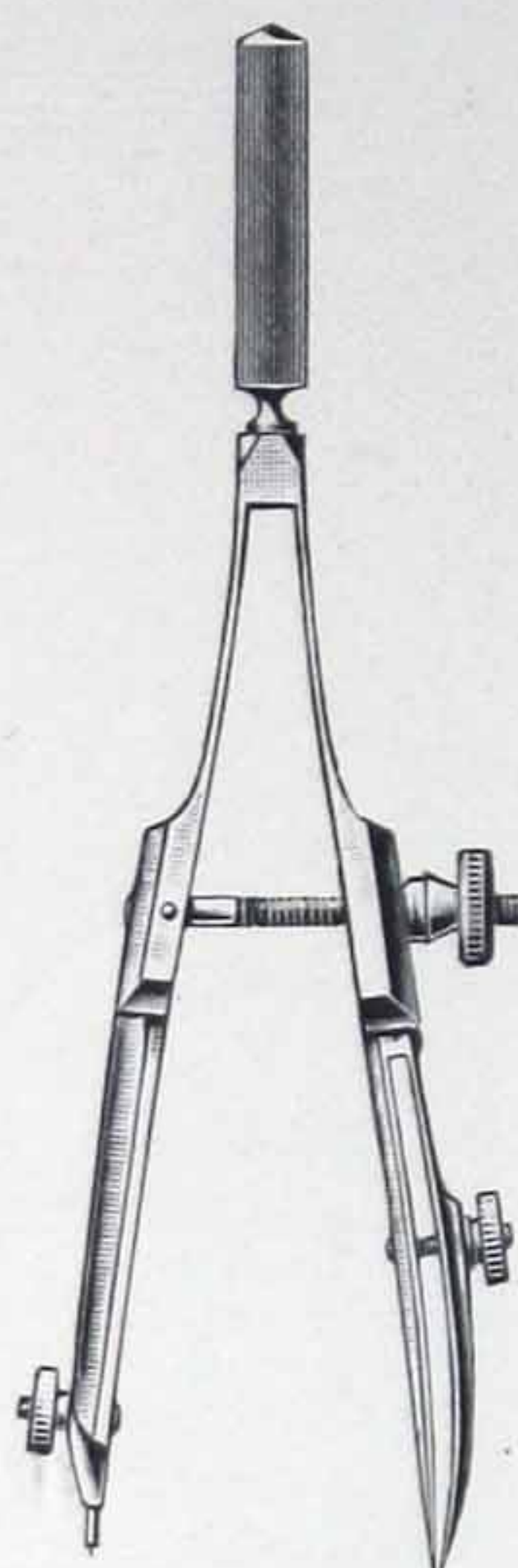
When ordering state number of compass this is to fit.

SEE PRICE LIST IN BACK OF CATALOG

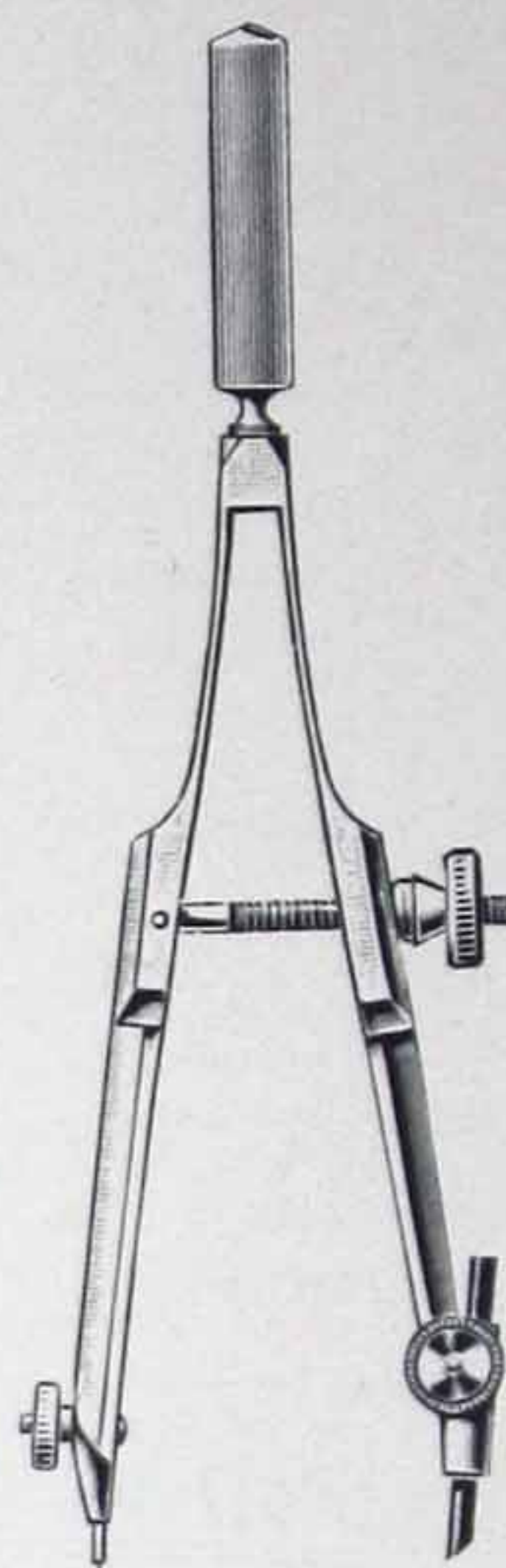
SUPERIOR DRAWING INSTRUMENTS



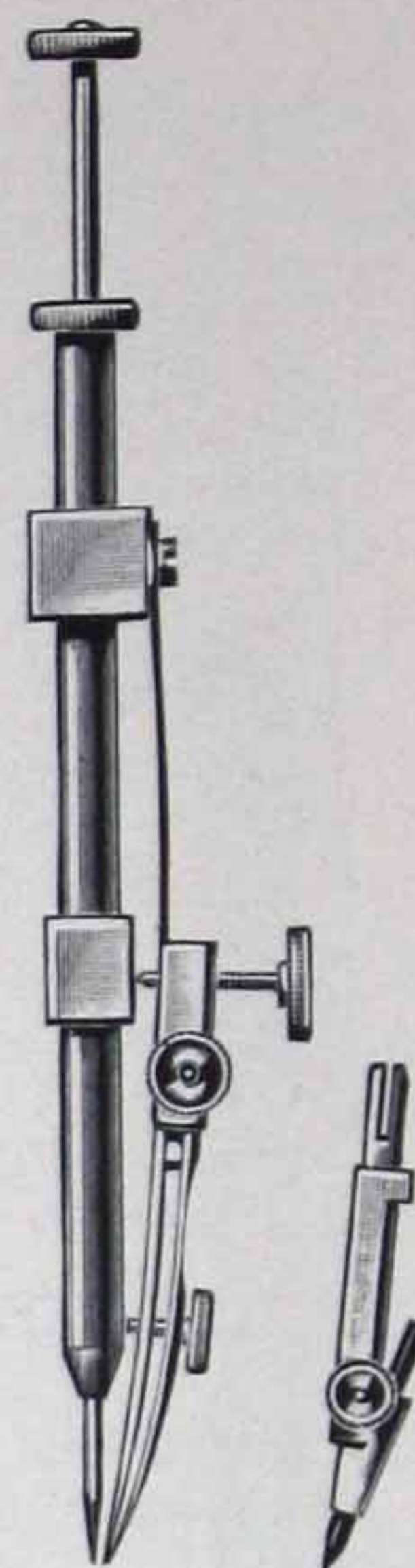
No. 1730S



No. 1732S

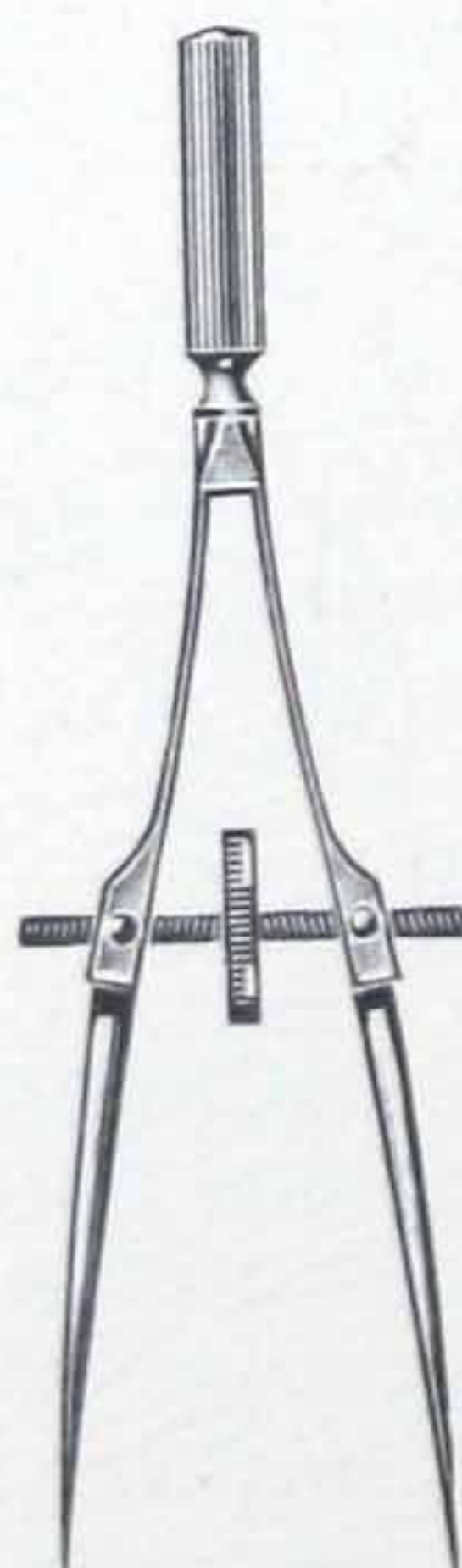


No. 1734S

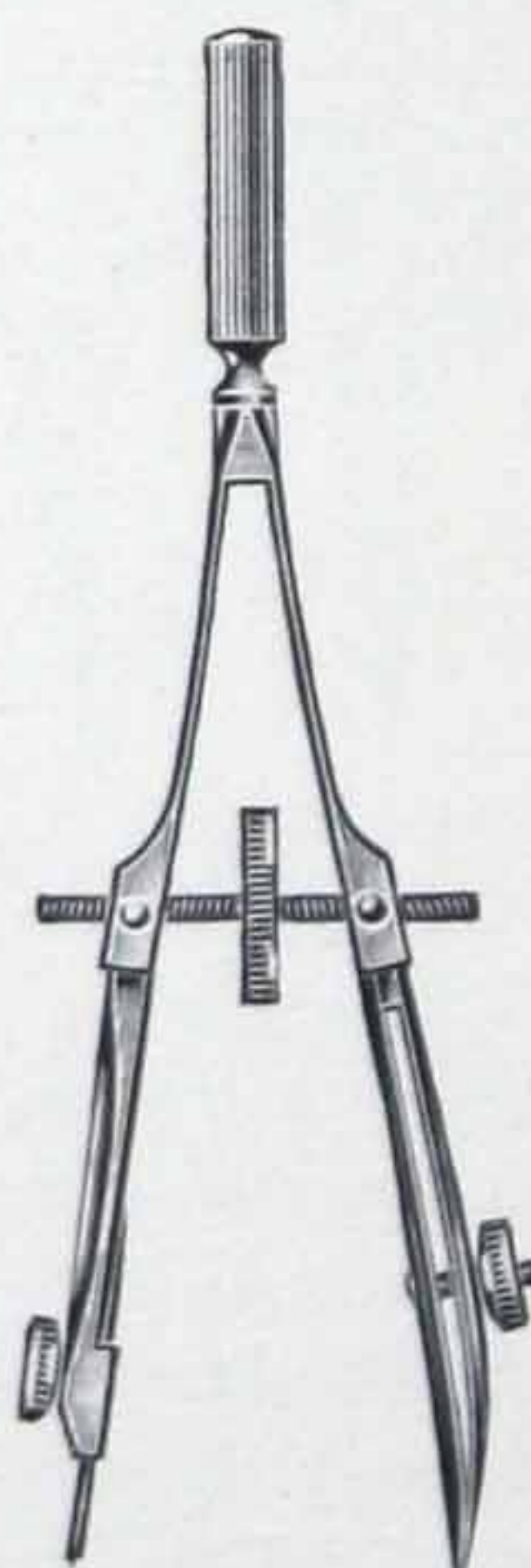


No. 1767C

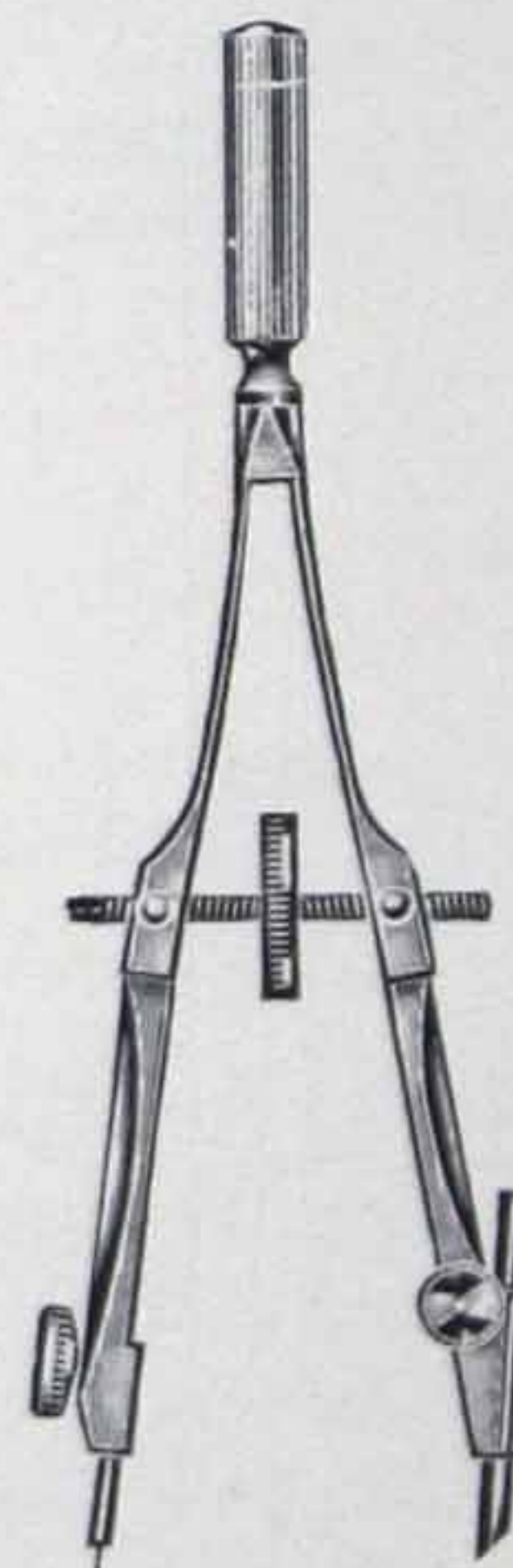
- | | | |
|------------|--|-----------------|
| No. 1730S. | Bow Divider, Side Adjustment, 3½ inch..... | Code Word |
| No. 1732S. | Bow Pen, Side Adjustment, 3½ inch..... | MORIPACK |
| No. 1734S. | Bow Pencil, Side Adjustment, 3½ inch..... | MORIPAD |
| No. 1766. | Drop Spring Bow Pen, 4 inch..... | MORIPAW |
| No. 1767C. | Drop Spring Bow Pen with Pencil Part, 4 inch, in case. | MORIPO |
| | | MORIPLE |



No. 1740C



No. 1742C

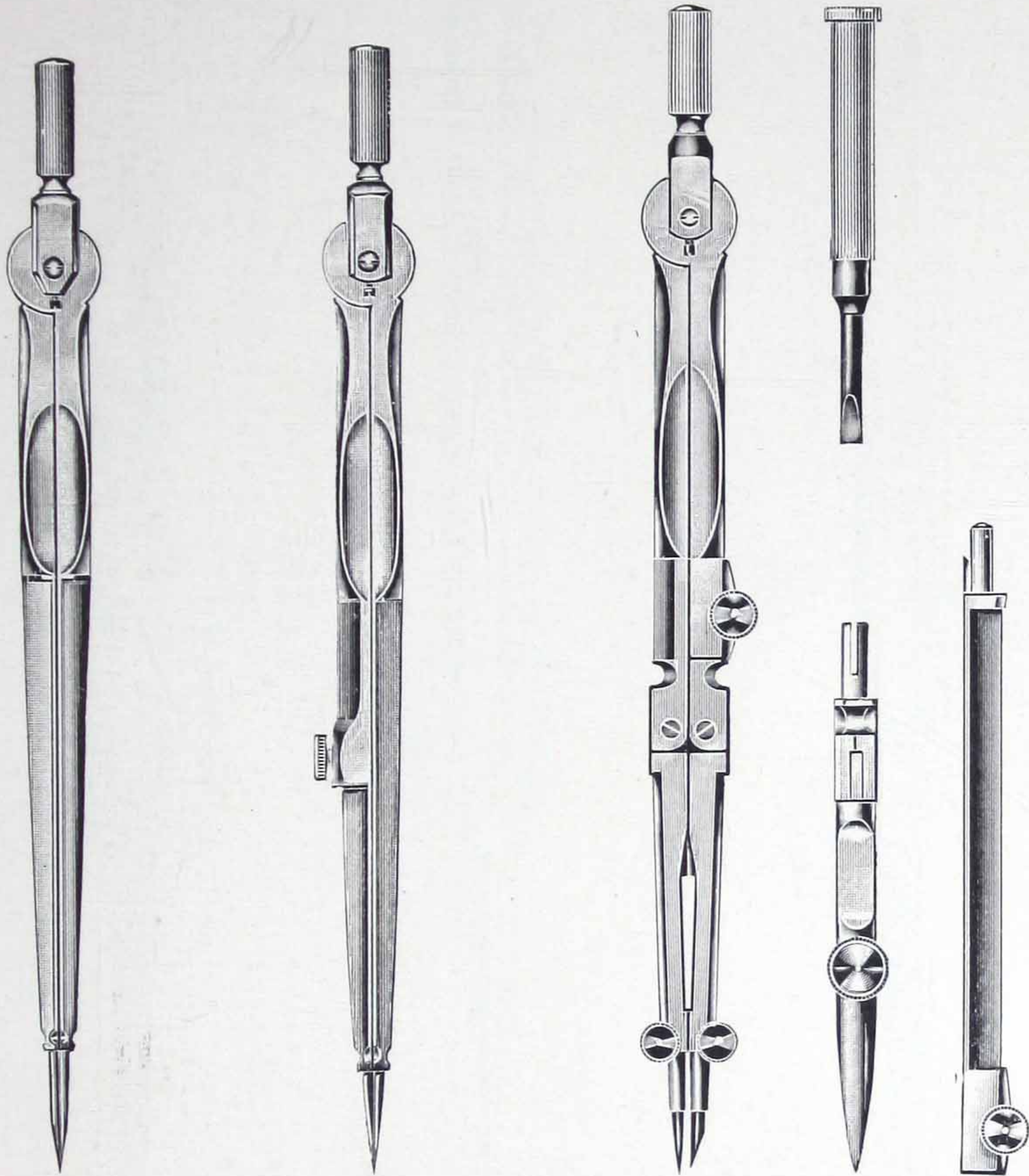


No. 1744C

- | | | |
|------------|--|----------------|
| No. 1740C. | Bow Divider, Center Adjustment, 3½ inch..... | Code Word |
| No. 1742C. | Bow Pen, Center Adjustment, 3½ inch..... | MORN |
| No. 1744C. | Bow Pencil, Center Adjustment, 3½ inch..... | MORNA |
| | | MORNING |

SEE PRICE LIST IN BACK OF CATALOG

SUPERIOR DRAWING INSTRUMENTS



No. 1780-2

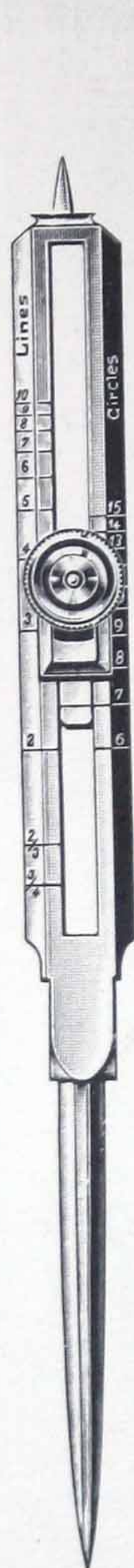
No. 1781

No. 1784

- | | | |
|-------------|---|----------------------------|
| No. 1780-2. | Plain Dividers, 6 inch..... | Code Word
MORRIS |
| No. 1781. | Hairspring Dividers, 6 inch..... | MORROW |
| No. 1784. | Compasses, 6 inch, with fixed needle point, pen and pencil parts and lengthening bar..... | MORSEL |
- All Dividers and Compasses equipped with straightening device.

SEE PRICE LIST IN BACK OF CATALOG

SUPERIOR DRAWING INSTRUMENTS



No. 1790C



No. 1791C



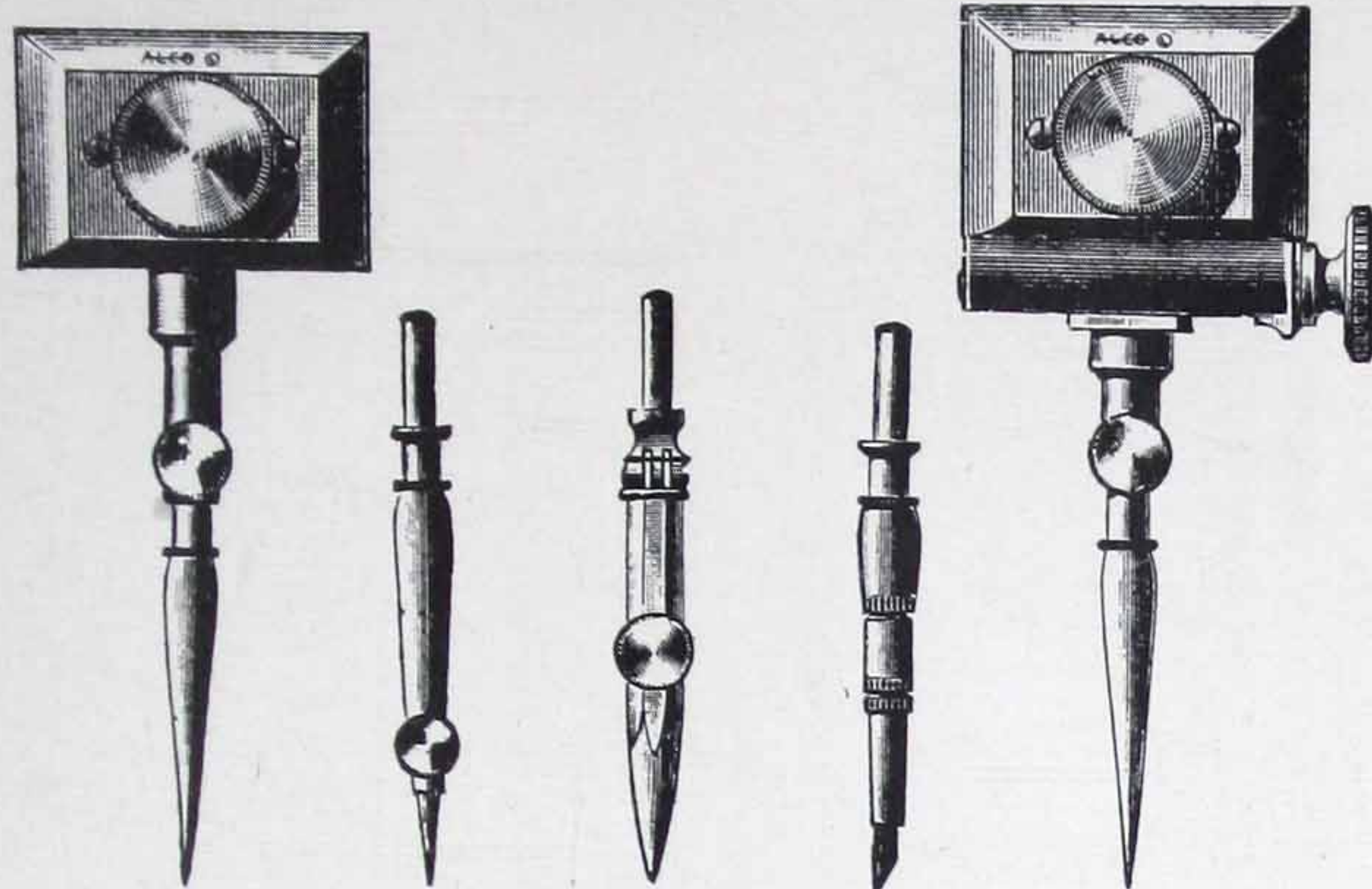
No. 1794
Code Word

- | | | |
|------------|--|-----------------|
| No. 1790C. | Proportional Divider, $7\frac{1}{2}$ in., for lines and circles, in velvet-lined case..... | MORTAR |
| No. 1791C. | Proportional Divider, $7\frac{1}{2}$ in., with rack movement, for lines, circles, planes and solids, in velvet-lined case..... | MORTISE |
| No. 1794. | Brass Proportional Divider, $6\frac{1}{2}$ in., for lines, in velvet-lined case..... | MOSQUITO |
| No. 1794G. | German Silver Proportional Divider, $6\frac{1}{2}$ in., for lines, in velvet-lined case..... | MOSTET |

For other Proportional Dividers see page 224.

SEE PRICE LIST IN BACK OF CATALOG

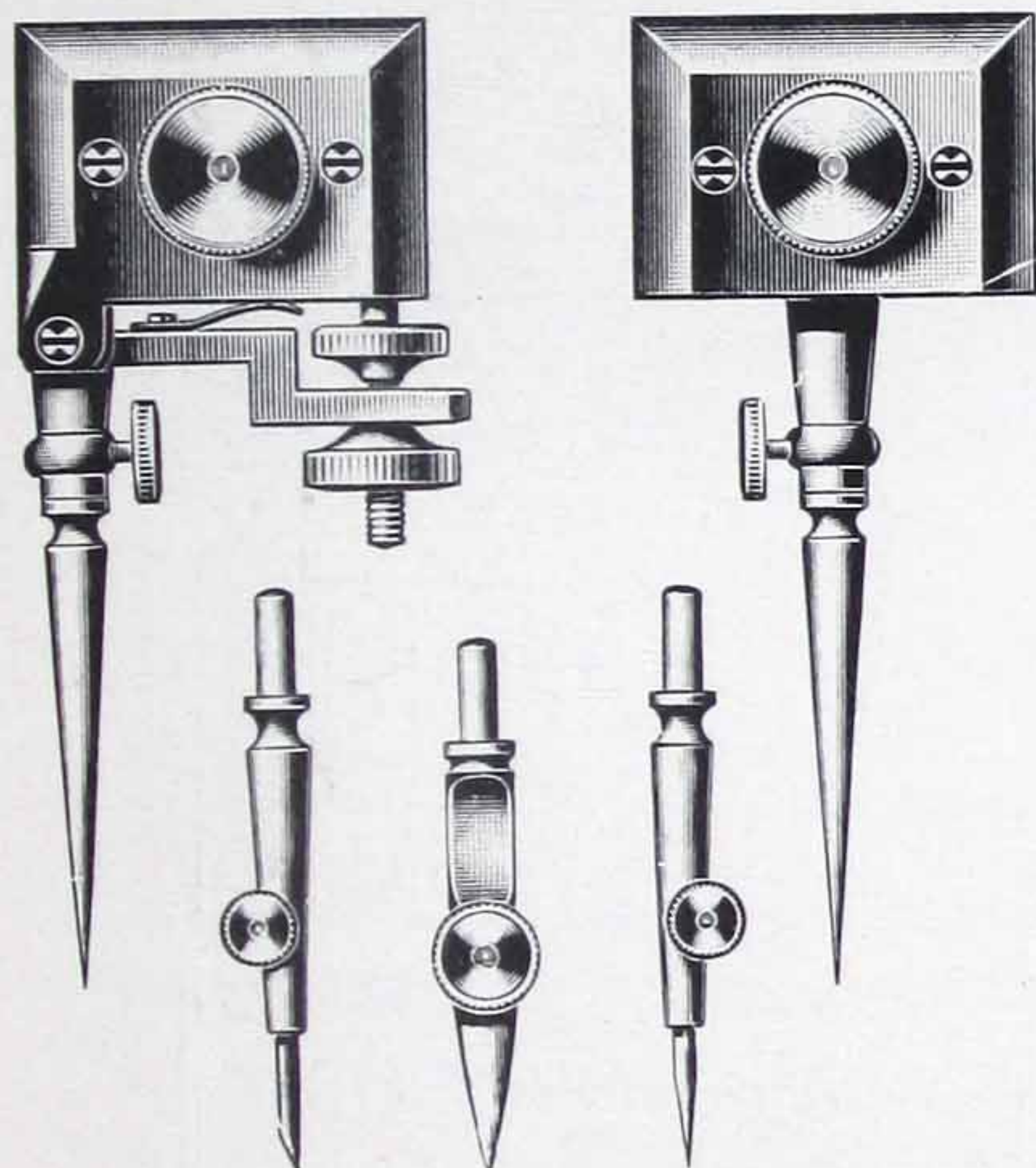
SUPERIOR DRAWING INSTRUMENTS



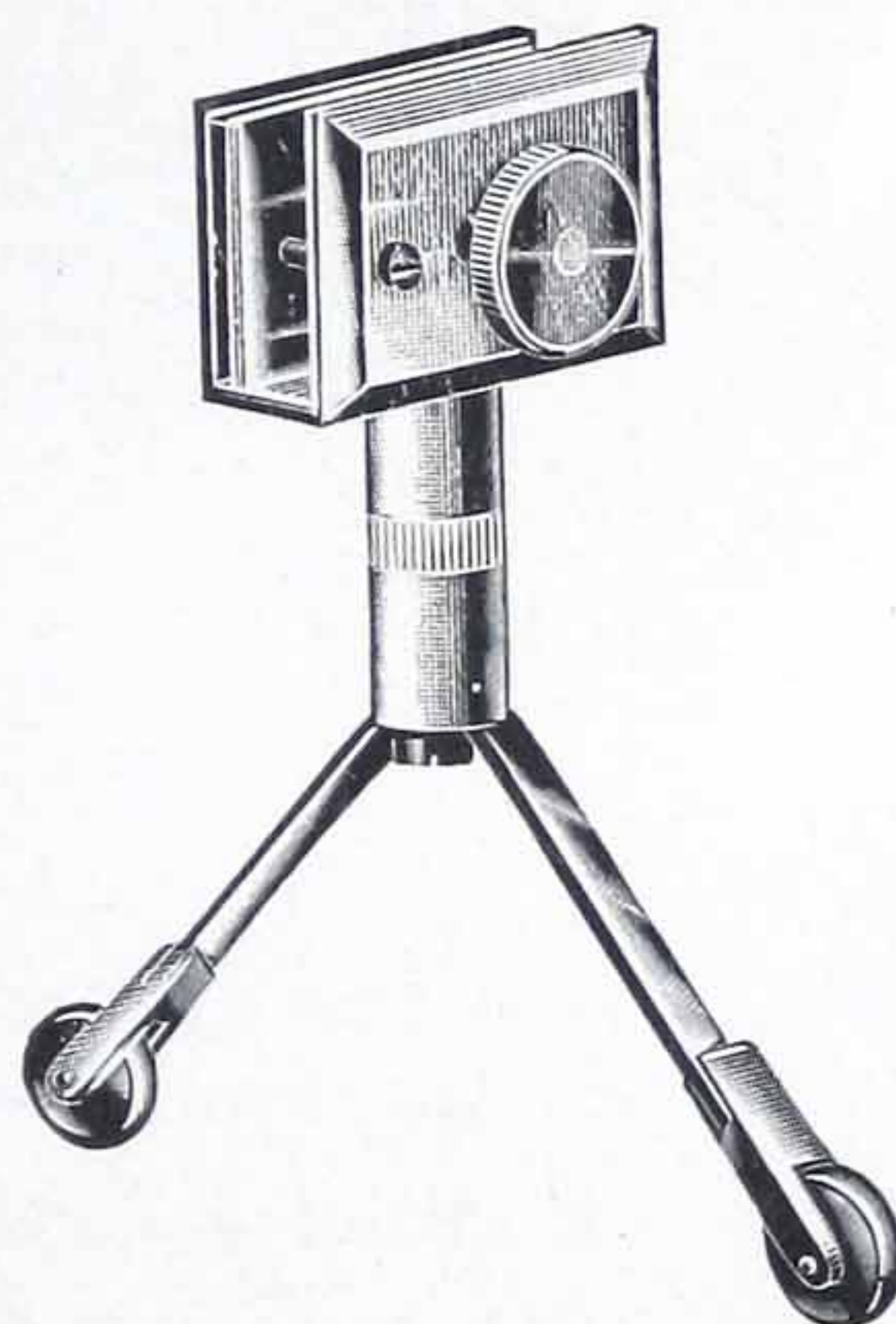
No. 1795C

Code Word

- No. 1795C.** Beam Compass with two steel points, pen, pencil and needle parts, lateral micrometer adjustment in morocco velvet lined case.....**MOTET**



No. 1796C



No. 1797

Code Word

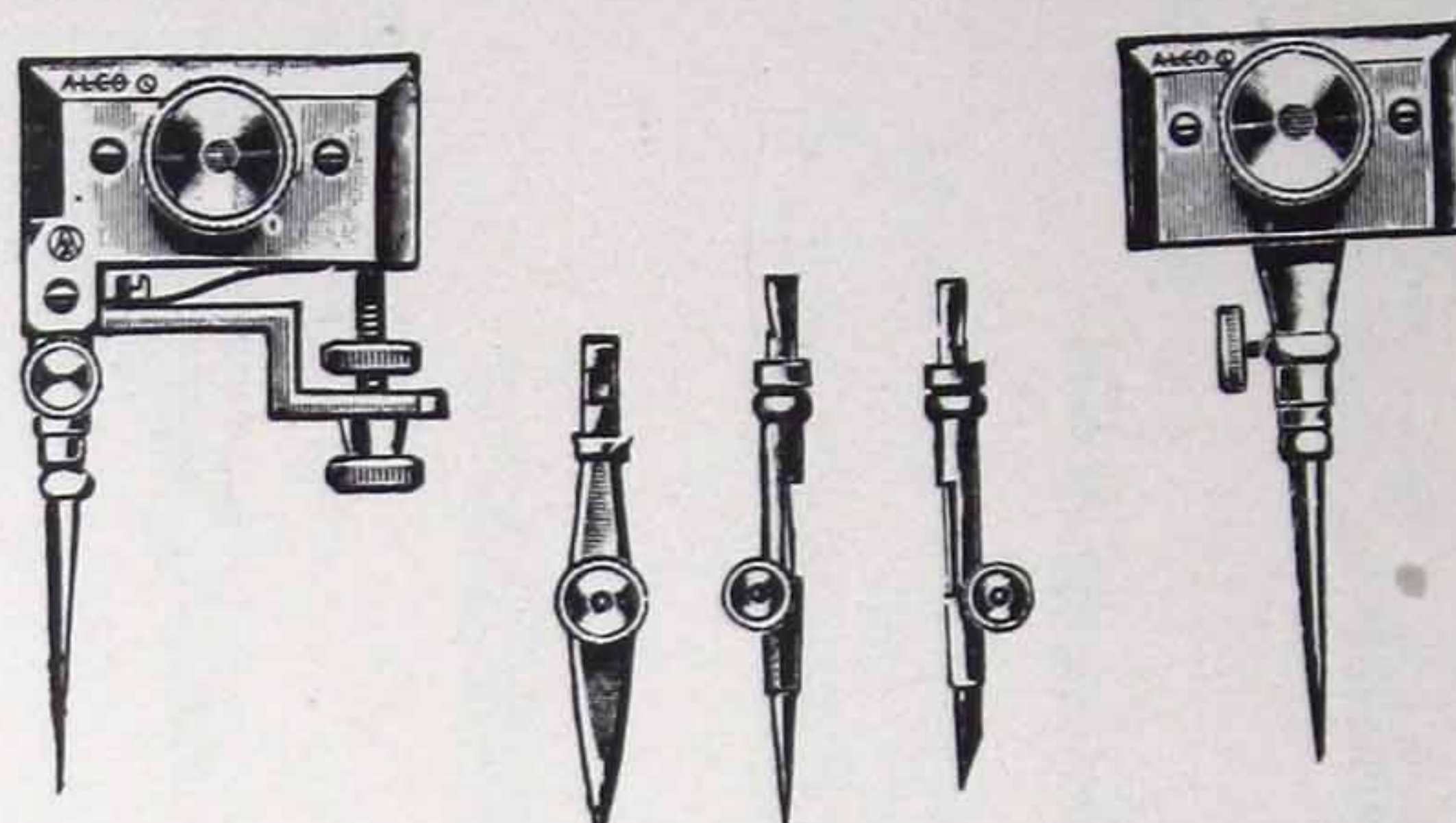
- No. 1796C.** Beam Compass, with two steel points, pen, pencil and needle parts, vertical micrometer adjustment, in morocco velvet-lined case.....**MOTTO**
- No. 1797.** Wheel Attachment or Balance for Beam Compasses Nos. 1795 and 1796.....**MOUJIK**
- No. 1797C.** Case only, velvet-lined, to contain Beam Compass No. 1795 and attachment No. 1797.....**MOULIN**
- No. 1798C.** Case only, velvet-lined, to contain Beam Compass No. 1796 and attachment No. 1797.....**MOULT**

For other Beam Compasses see page 225.

For Beam Compass Bars (hardwood) see page 225.

SEE PRICE LIST IN BACK OF CATALOG

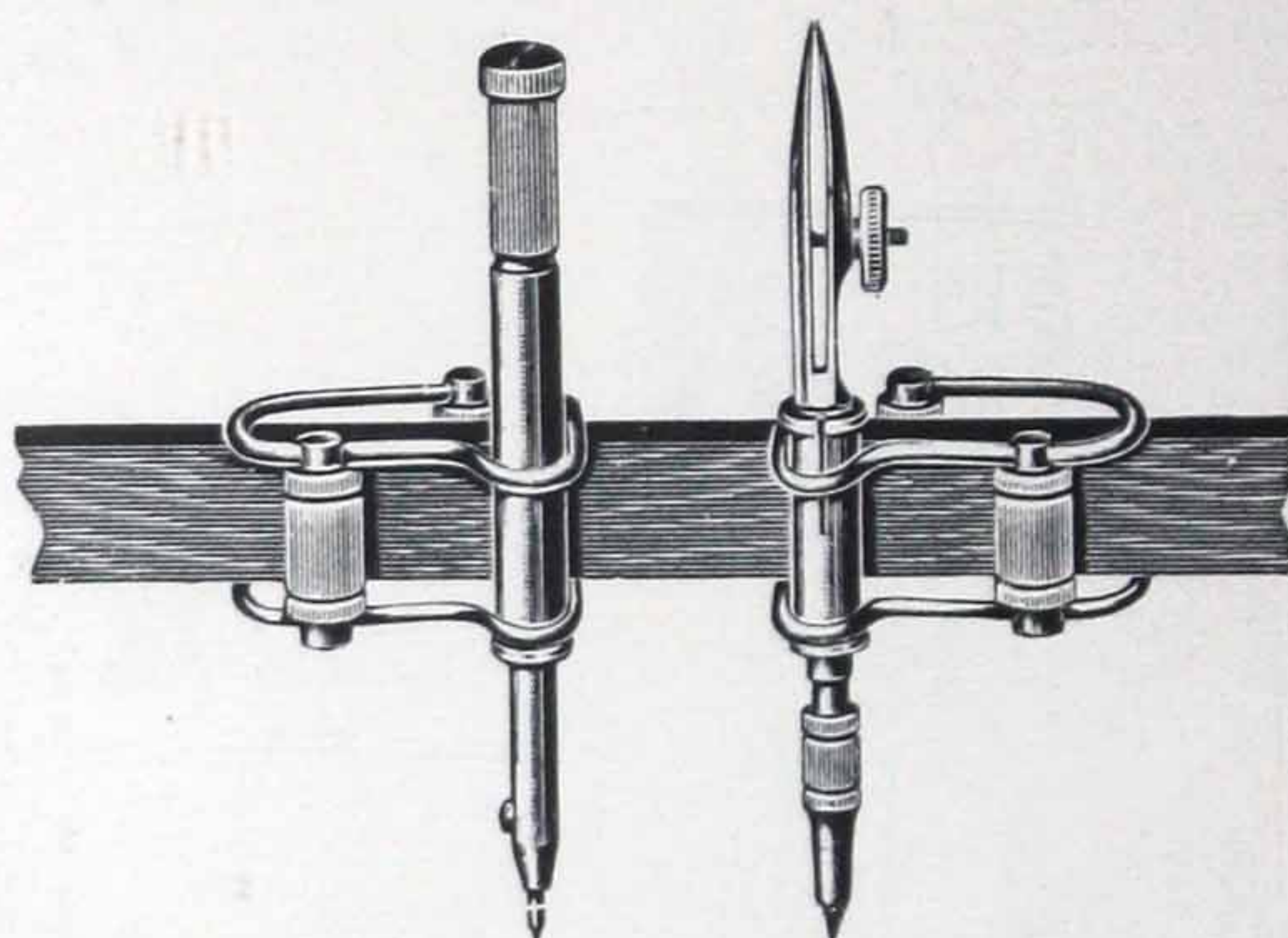
SUPERIOR DRAWING INSTRUMENTS



No. 1796 $\frac{1}{2}$ C

Code Word

No. 1796 $\frac{1}{2}$ C. Minute Beam Compass with two steel points, pen, pencil and needle parts, vertical micrometer adjustment, in morocco velvet-lined case.....**MUFF**



No. 1799

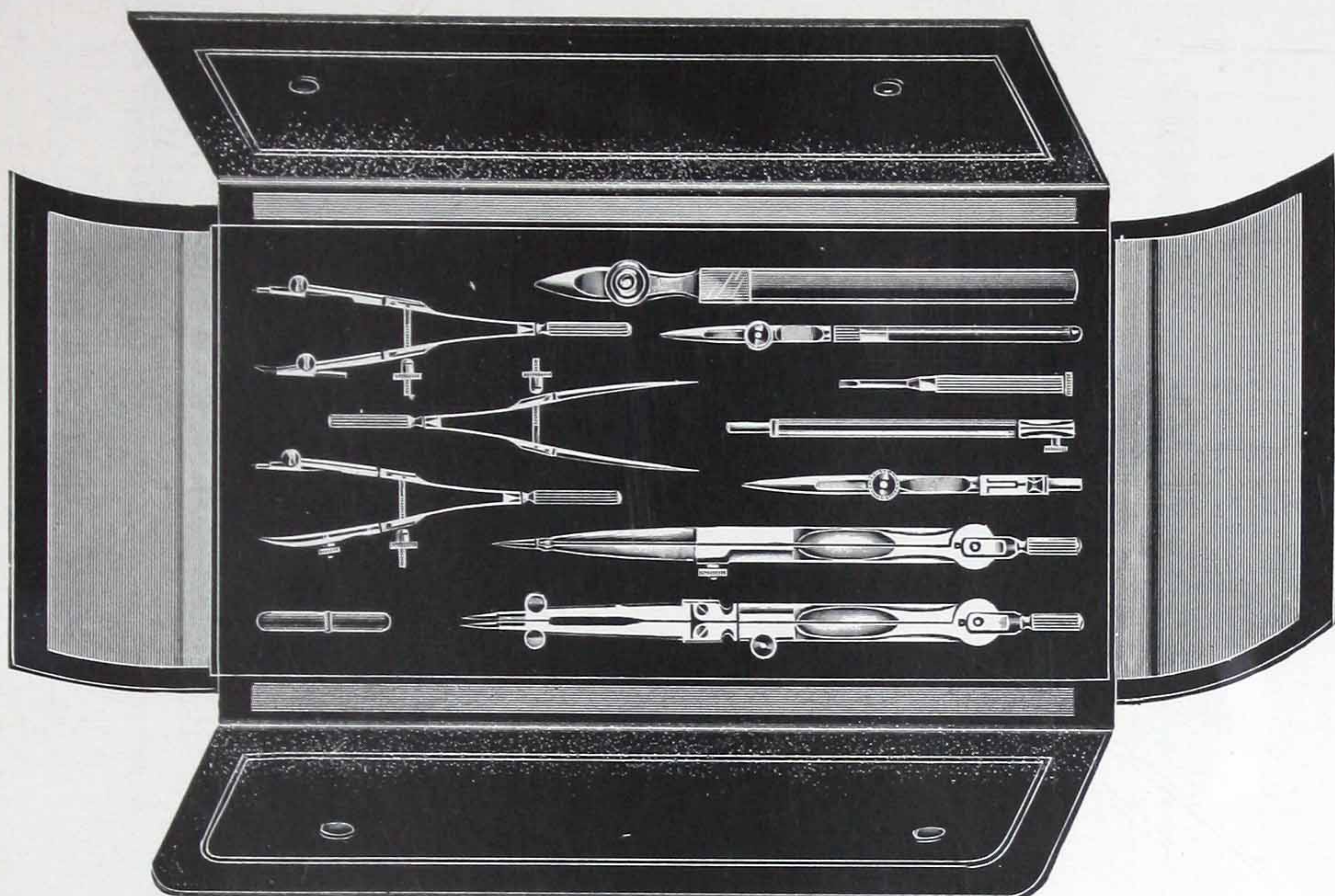
Code Word

- No. 1799. Beam Compass, with replaceable needle point, pen, and pencil parts and 30 inch wooden beam.....**MOWER**
- No. 1799A. Extra Needle Point with 4 spare needles.....**MOWAIN**
- No. 1799B. Extra Pen and Pencil part.....**MOWEEP**
- No. 1799C. Extra Wooden Beam 30 inches long.....**MOWIN**

SEE PRICE LIST IN BACK OF CATALOG

SUPERIOR DRAWING INSTRUMENTS

In Cases



No. 1826S

No. 1826S. Pocket Book Case, velvet-lined, containing:

No. 1700. Ruling Pen, 4½ inch.

No. 1711. Detail Pen, 6 inch.

No. 1730S. Bow Divider, Side Adjustment, 3½ inch.

No. 1732S. Bow Pen, Side Adjustment, 3½ inch.

No. 1734S. Bow Pencil, Side Adjustment, 3½ inch.

No. 1781. Hairspring Divider, 6 inch.

No. 1784. Compasses, 6 inch, with pen and pencil parts and lengthening bar.

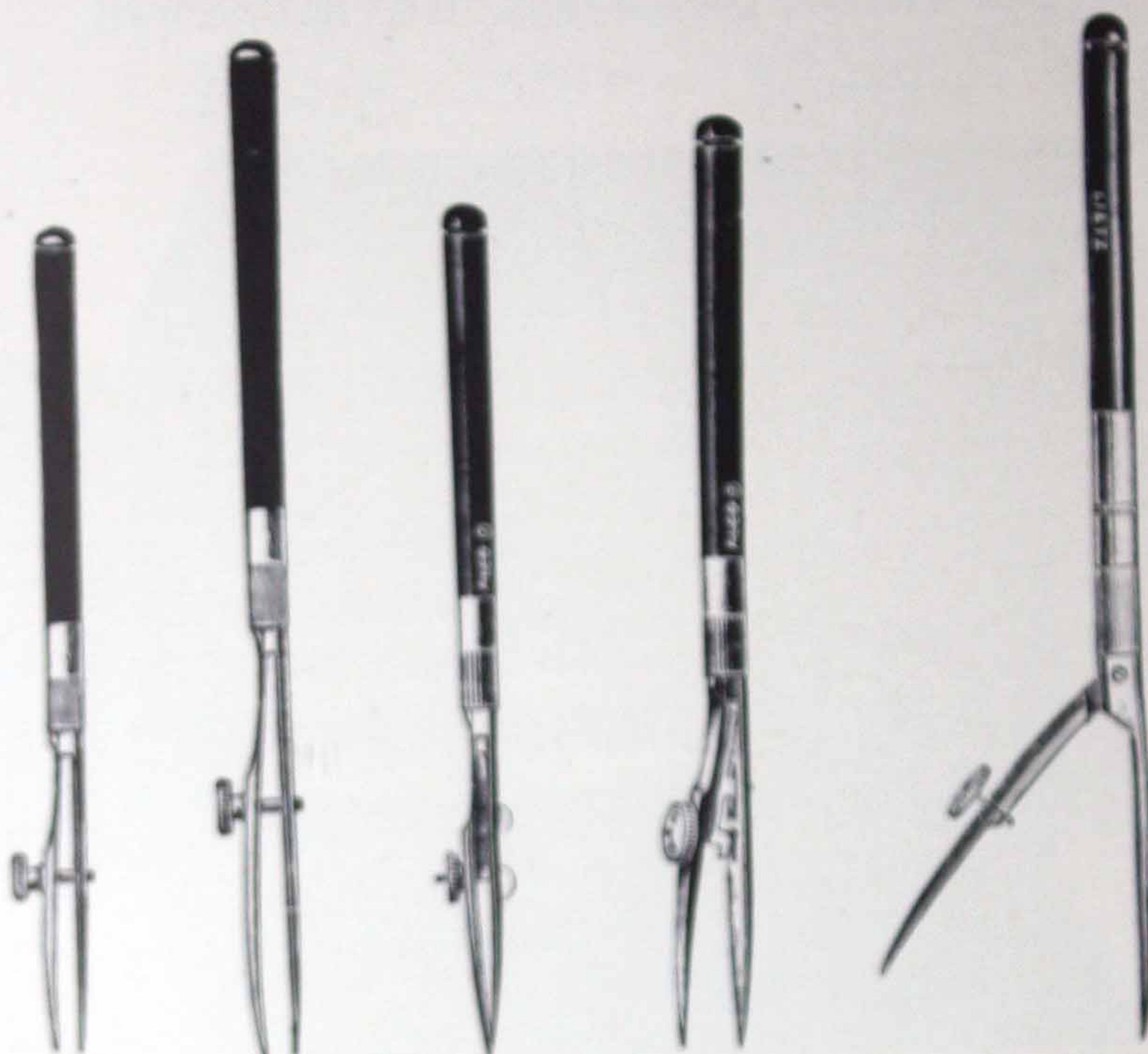
No. 1685-4. Combination Key and Lead Box.
Complete Box of Repair Parts.

Per Set.....Code Word, **NAILTIP**

Dividers and Compasses equipped with straightening device.

SEE PRICE LIST IN BACK OF CATALOG

RELIABLE DRAWING INSTRUMENTS



No. 1840

No. 1842

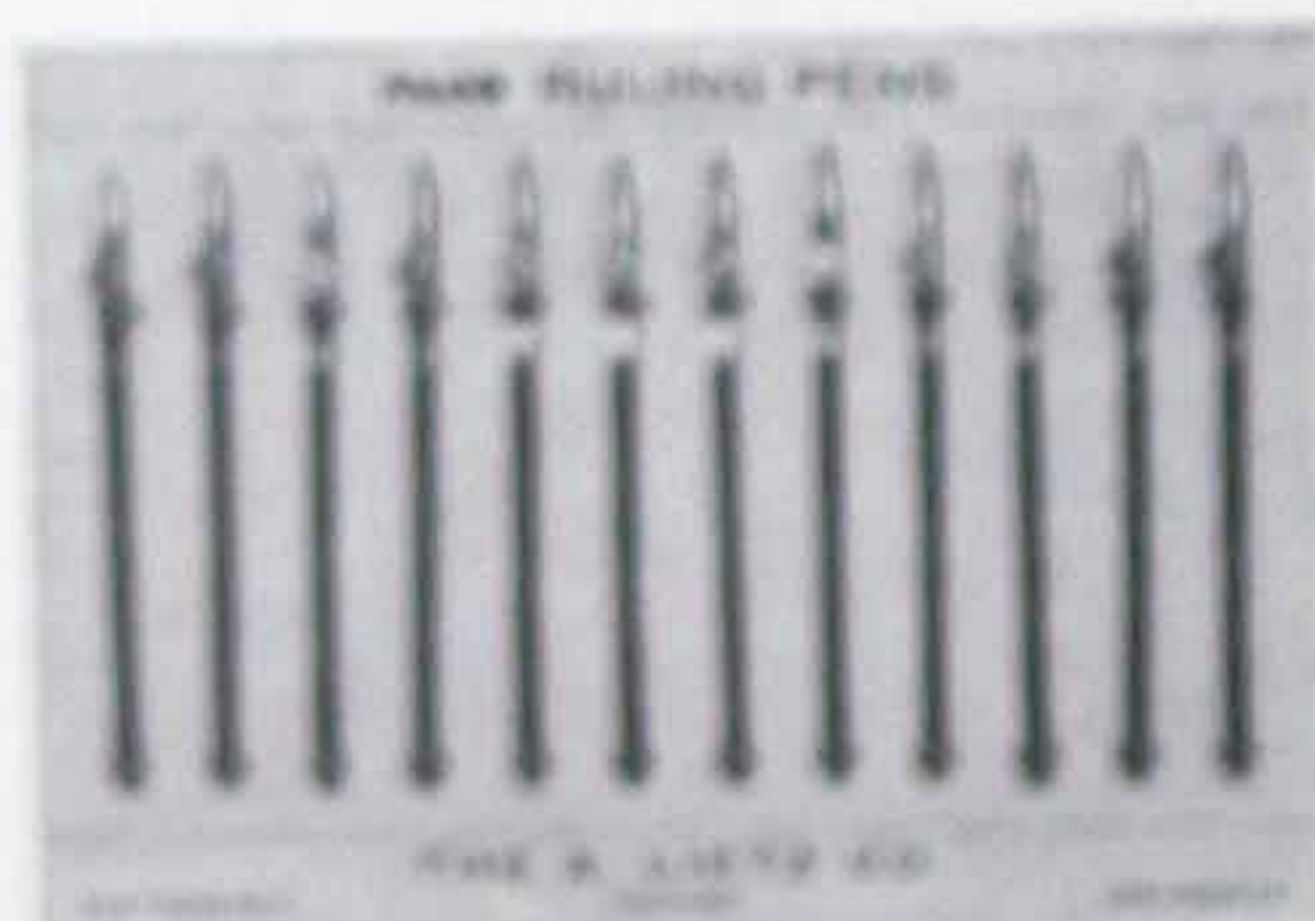
No. 1840SC

No. 1841SC

No. 1844

		Code Word
No. 1840.	Ruling Pen, Spring Blade, Ebony Handle, 4½ inch.	NEBULA
No. 1841.	Ruling Pen, Spring Blade, Ebony Handle, 5 inch.	NECTAR
No. 1842.	Ruling Pen, Spring Blade, Ebony Handle, 5½ inch.	NECKLACE
No. 1840SC.	Ruling Pen, slide catch opening, 4½ inch.	NEGRI
No. 1841SC.	Ruling Pen, slide catch opening, 5 inch.	NEGRILLO
No. 1842SC.	Ruling Pen, slide catch opening, 5½ inch.	NEGROID
No. 1843.	Ruling Pen, Knife Spring, 4½ inch.	NEGROLE
No. 1844.	Ruling Pen, Knife Spring, 5½ inch.	NEGRUM

RULING PEN ASSORTMENTS

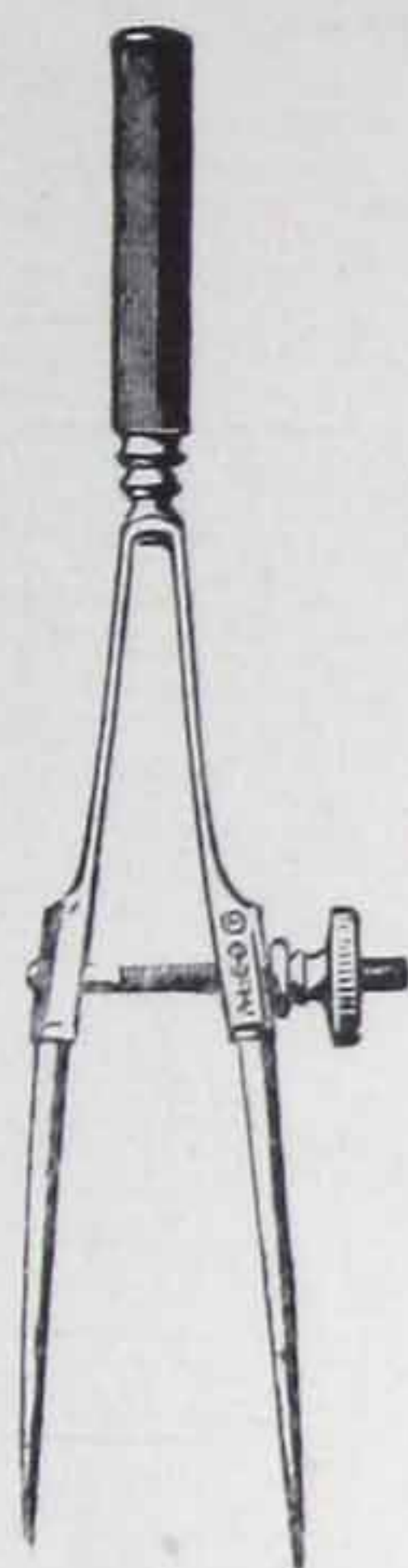


No. 1845

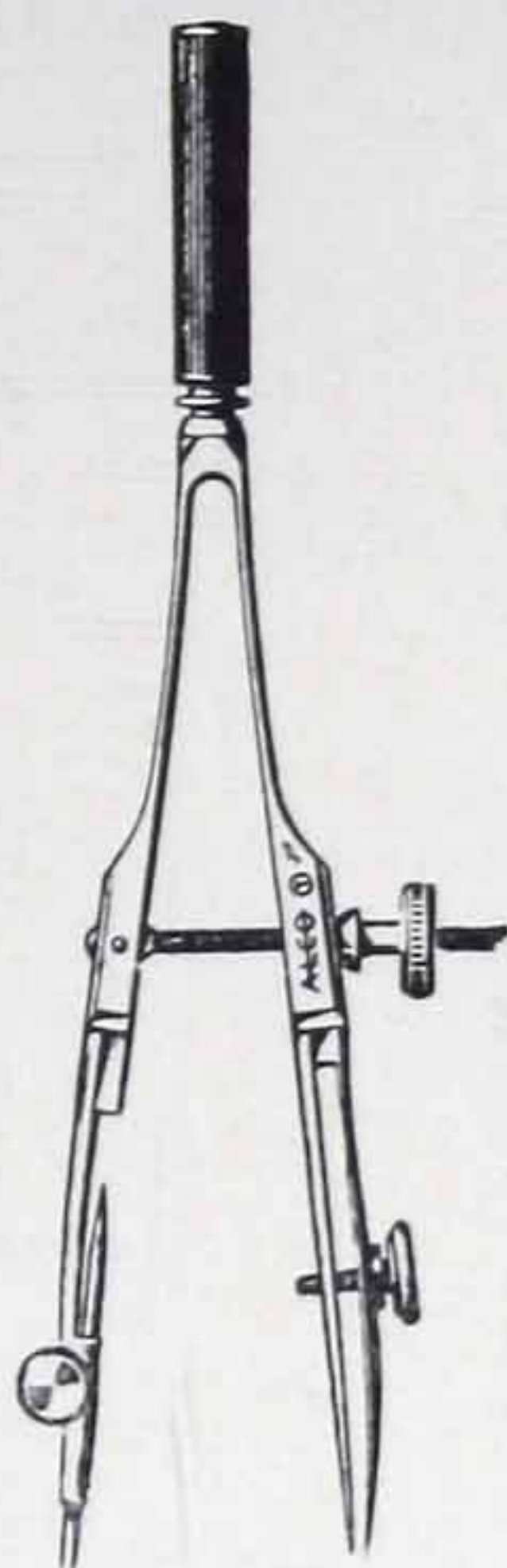
		Code Word
No. 1845.	12 "Reliable" Ruling Pens on card.	ABBEY
No. 1846.	12 "Universal" Ruling Pens on card.	ABBOT
No. 1847.	12 "Banner" Ruling Pens on card.	ABET

SEE PRICE LIST IN BACK OF CATALOG

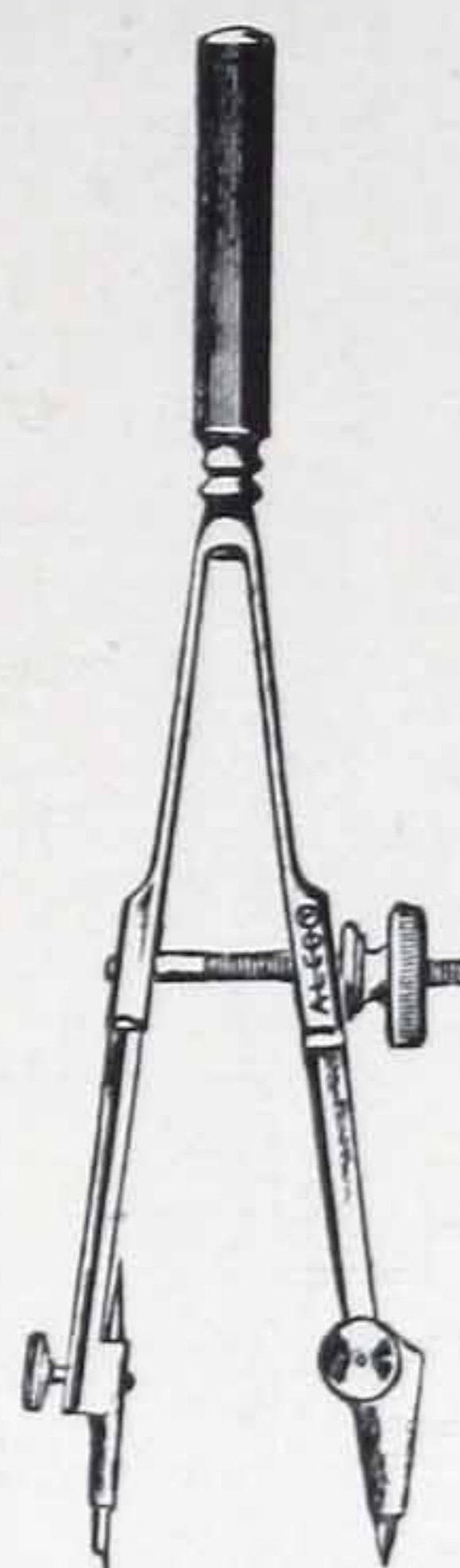
RELIABLE DRAWING INSTRUMENTS



No. 1850S

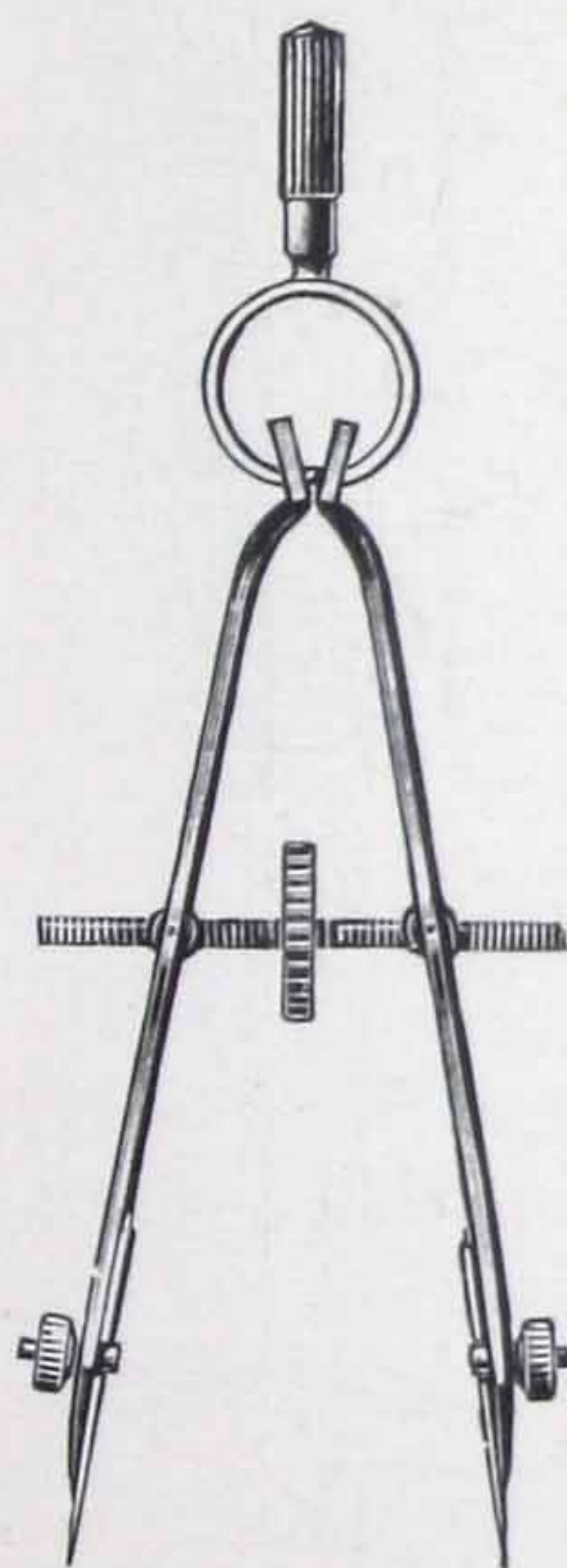


No. 1852S



No. 1854S

- | | | |
|------------|--|-----------------------------|
| No. 1850S. | Bow Divider, Side Adjustment, 3½ inch..... | Code Word
NEPTUNE |
| No. 1852S. | Bow Pen, Side Adjustment, 3½ inch..... | NEREID |
| No. 1854S. | Bow Pencil, Side Adjustment, 3½ inch..... | NEROLI |



No. 1860



No. 1862

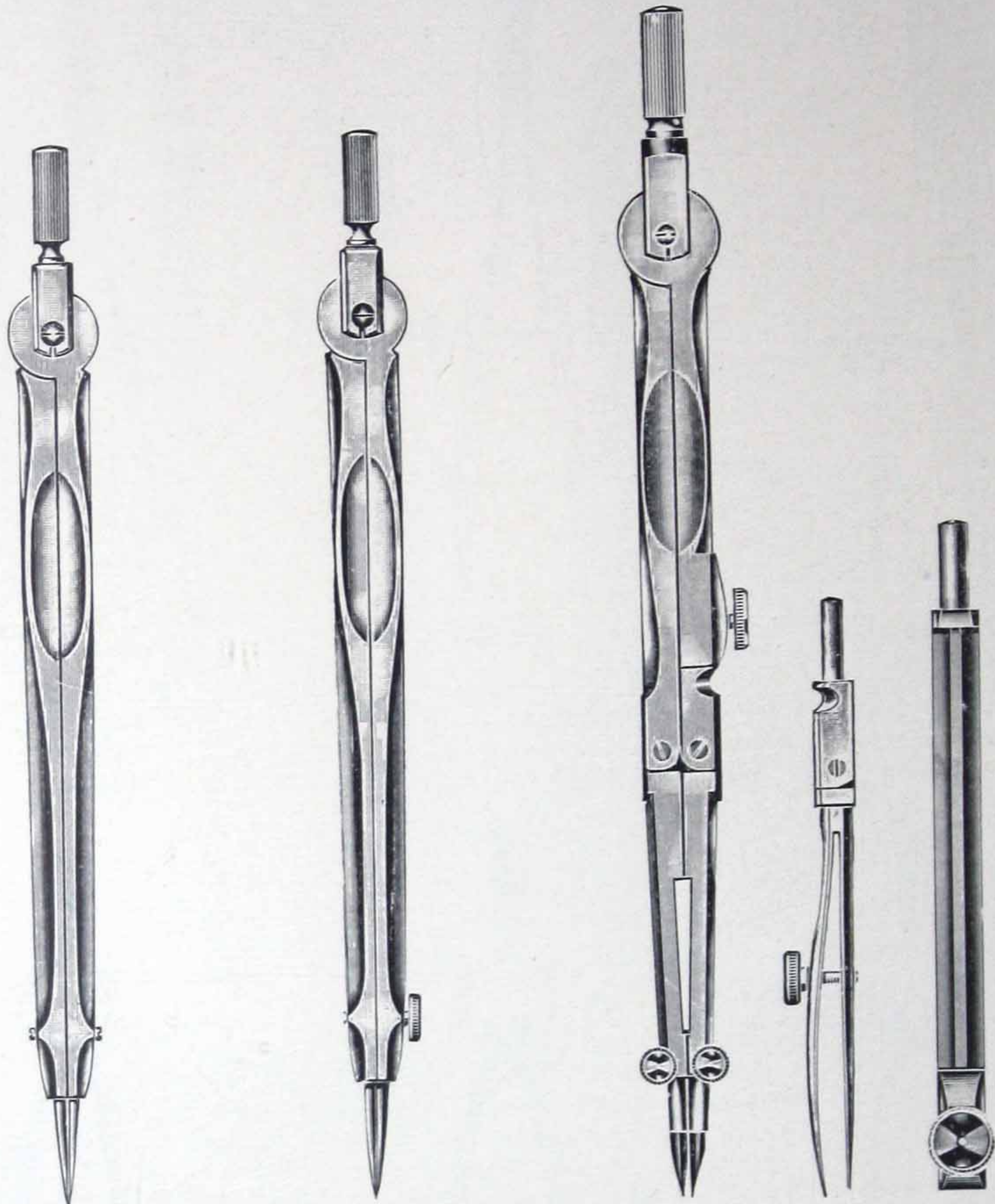


No. 1864

- | | | |
|-----------|---|-----------------------------|
| No. 1860. | Annular Spring Bow Divider, Center Adjustment, 4¼ inch..... | Code Word
NERVINE |
| No. 1862. | Annular Spring Bow Pen, Center Adjustment, 4¼ inch..... | NETTLE |
| No. 1864. | Annular Spring Bow Pencil, Center Adjustment, 4¼ inch..... | NEURAL |

SEE PRICE LIST IN BACK OF CATALOG

RELIABLE DRAWING INSTRUMENTS



- No. 1880-2S

No. 1881S

No. 1884³/₄S
- No. 1880-2S. Plain Divider, 6 inch.....

No. 1881S. Hairspring Divider, 6 inch.....

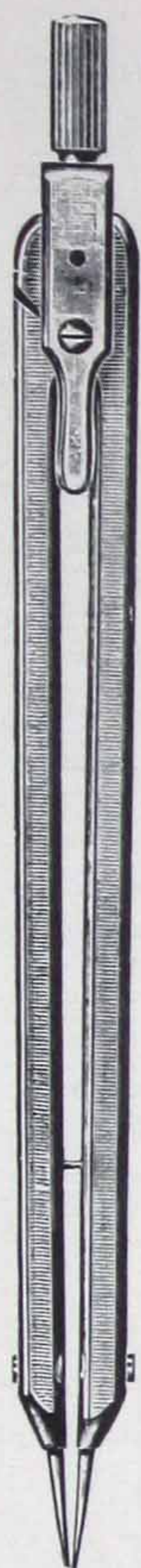
No. 1884³/₄S. Compasses, 6 inch, with fixed needle point, pen and pencil parts and lengthening bar.....
- Code Word
- NEWEL
- NEWT
- NEXUS

All Dividers and Compasses equipped with straightening device.

Note.—For extra parts for RELIABLE Drawing Instruments, see page 269.

SEE PRICE LIST IN BACK OF CATALOG

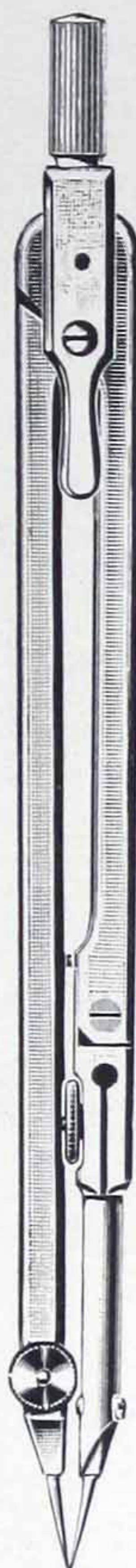
RELIABLE DRAWING INSTRUMENTS



No. 1880-2R



No. 1881R



No. 1884³/₄R



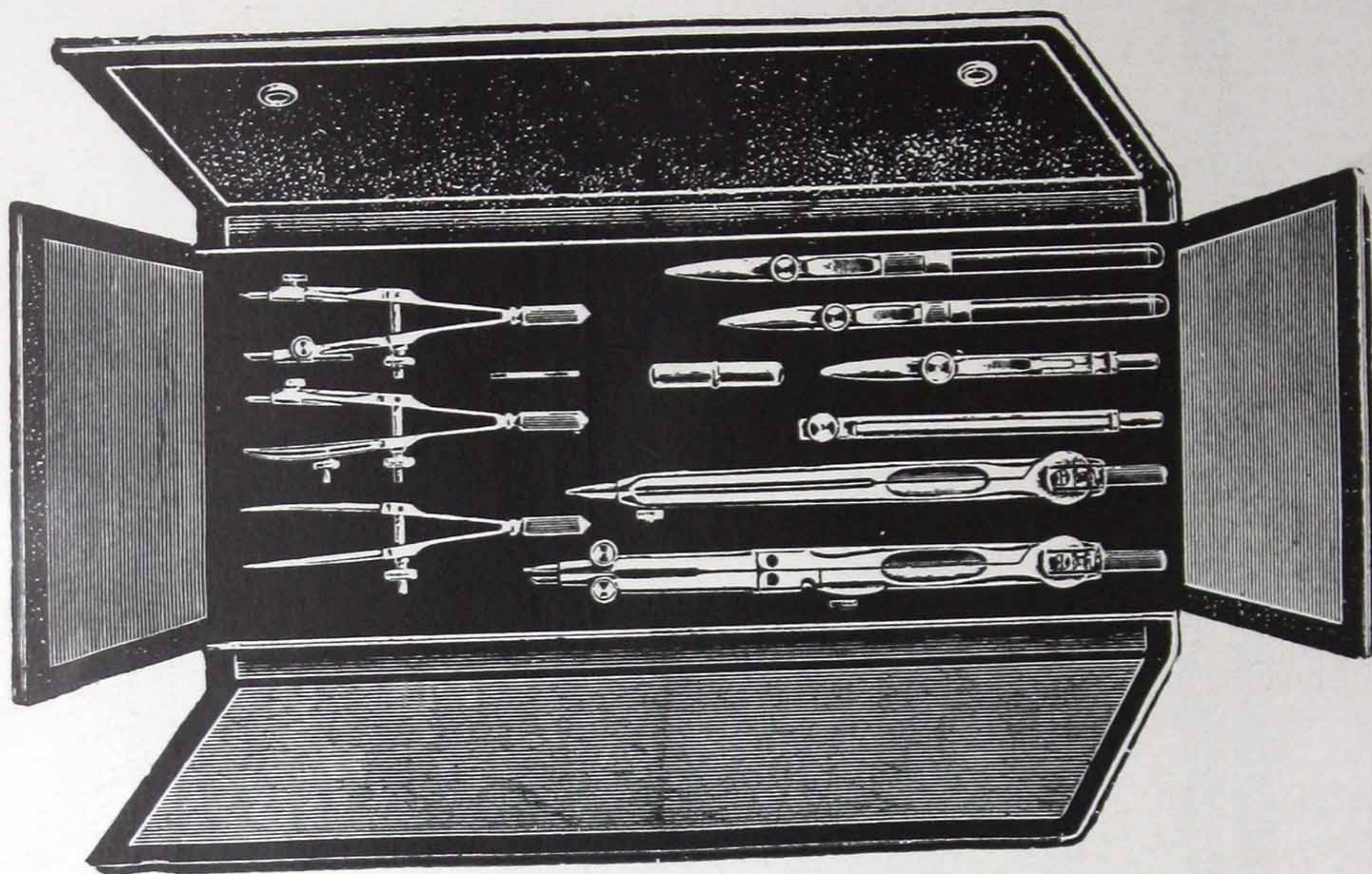
- | | | Code Word |
|--|---|-----------------|
| No. 1880-2R | Plain Divider, 5 ³ / ₄ inch..... | NIBLICK |
| No. 1881R. | Hairspring Divider, 5 ³ / ₄ inch..... | NICOLITE |
| No. 1882N. | Compasses, 4 inch, with divider, pen and pencil parts..... | NICKER |
| No. 1884³/₄R. | Compasses, 6 inch, with reversible needle point, divider, pen and pencil parts and lengthening bar... | NICKY |

All Dividers and Compasses equipped with straightening device.

SEE PRICE LIST IN BACK OF CATALOG

RELIABLE DRAWING INSTRUMENTS

In Cases



No. 1894S

No. 1894S. Pocket Book Case, velvet-lined, containing:

No. 1840. Ruling Pen, 4½ inch.

No. 1842. Ruling Pen, 5½ inch.

No. 1850S. Bow Divider, Side Adjustment, 3½ inch.

No. 1852S. Bow Pen, Side Adjustment, 3½ inch.

No. 1854S. Bow Pencil, Side Adjustment, 3½ inch.

No. 1881S. Hairspring Divider, 6 inch.

No. 1884¾S. Compasses, 6 inch, with pen and pencil parts and lengthening bar.

Box with leads, key and complete box of repair parts.

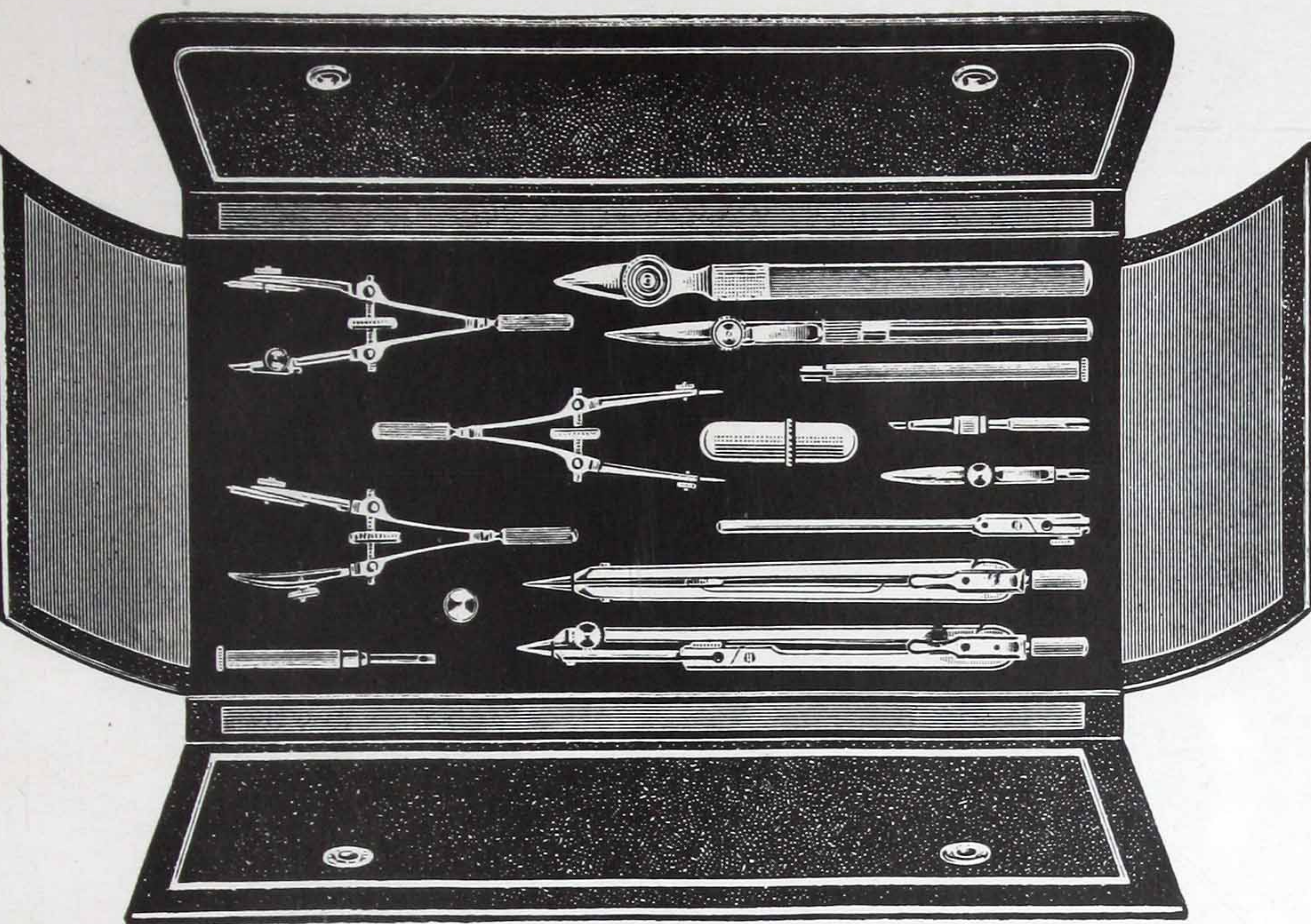
Per Set.....Code Word, **OXYGEN**

Dividers and Compasses equipped with straightening device.

SEE PRICE LIST IN BACK OF CATALOG

RELIABLE DRAWING INSTRUMENTS

In Cases



No. 1894N

No. 1894N. Pocket Book Case, velvet-lined, containing:

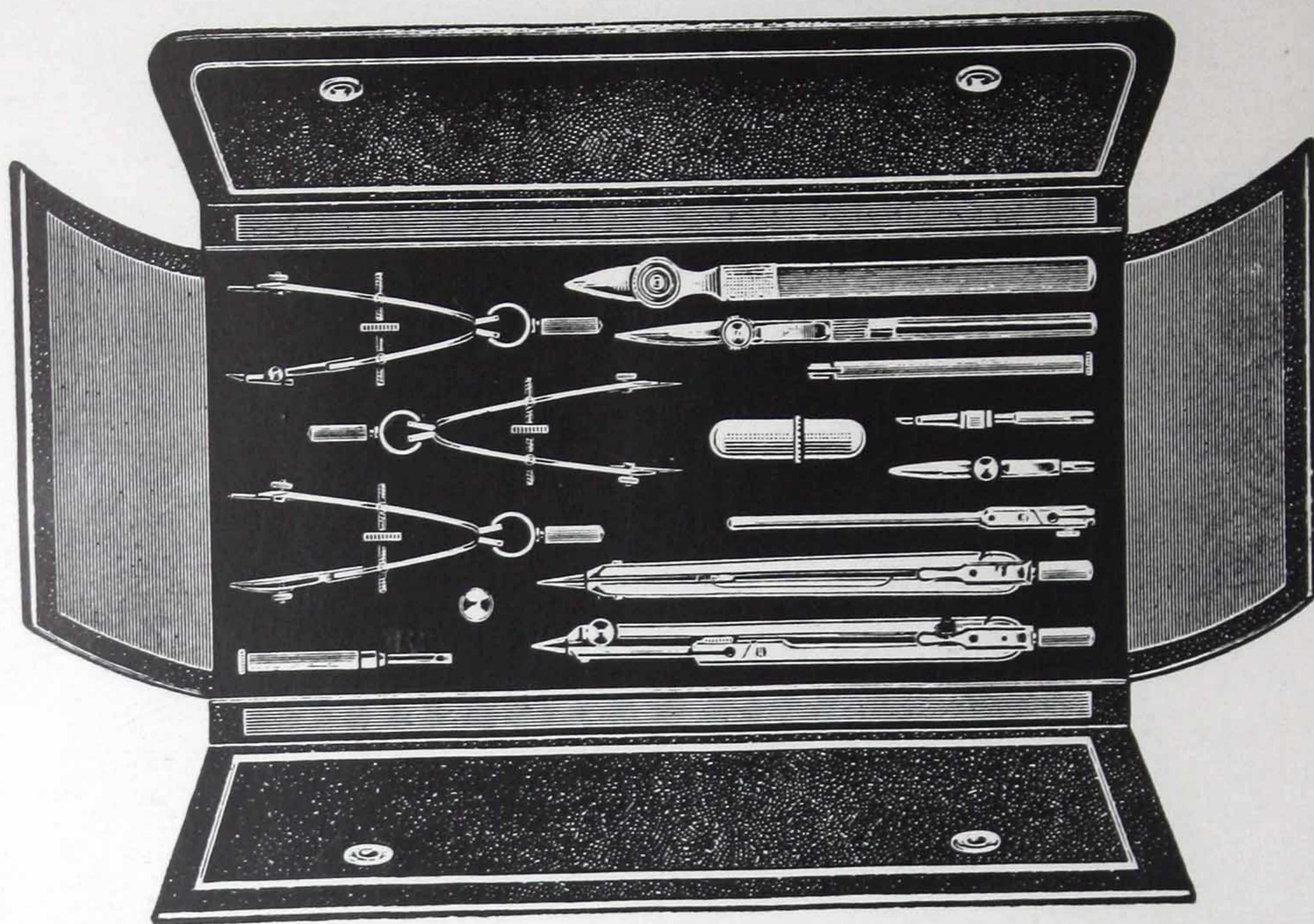
- No. 1841.** Ruling Pen, 5 inch.
- No. 1711.** Detail Pen, 6 inch.
- No. 1740C.** Bow Divider, Center Adjustment, $3\frac{1}{2}$ inch.
- No. 1742C.** Bow Pen, Center Adjustment, $3\frac{1}{2}$ inch.
- No. 1744C.** Bow Pencil, Center Adjustment, $3\frac{1}{2}$ inch.
- No. 1881R.** Hairspring Divider, $5\frac{3}{4}$ inch.
- No. 1884 $\frac{3}{4}$ R.** Compasses, 6 inch with divider, pen and pencil parts and lengthening bar.
- No. 1685-7** Center Tack.
Box with leads, key and complete box of repair parts.
Per Set.....Code Word, **OSTRICH**

All Dividers and Compasses equipped with straightening device.

SEE PRICE LIST IN BACK OF CATALOG

RELIABLE DRAWING INSTRUMENTS

In Cases



No. 1896C

No. 1896C. Pocket Book Case, velvet-lined, containing:

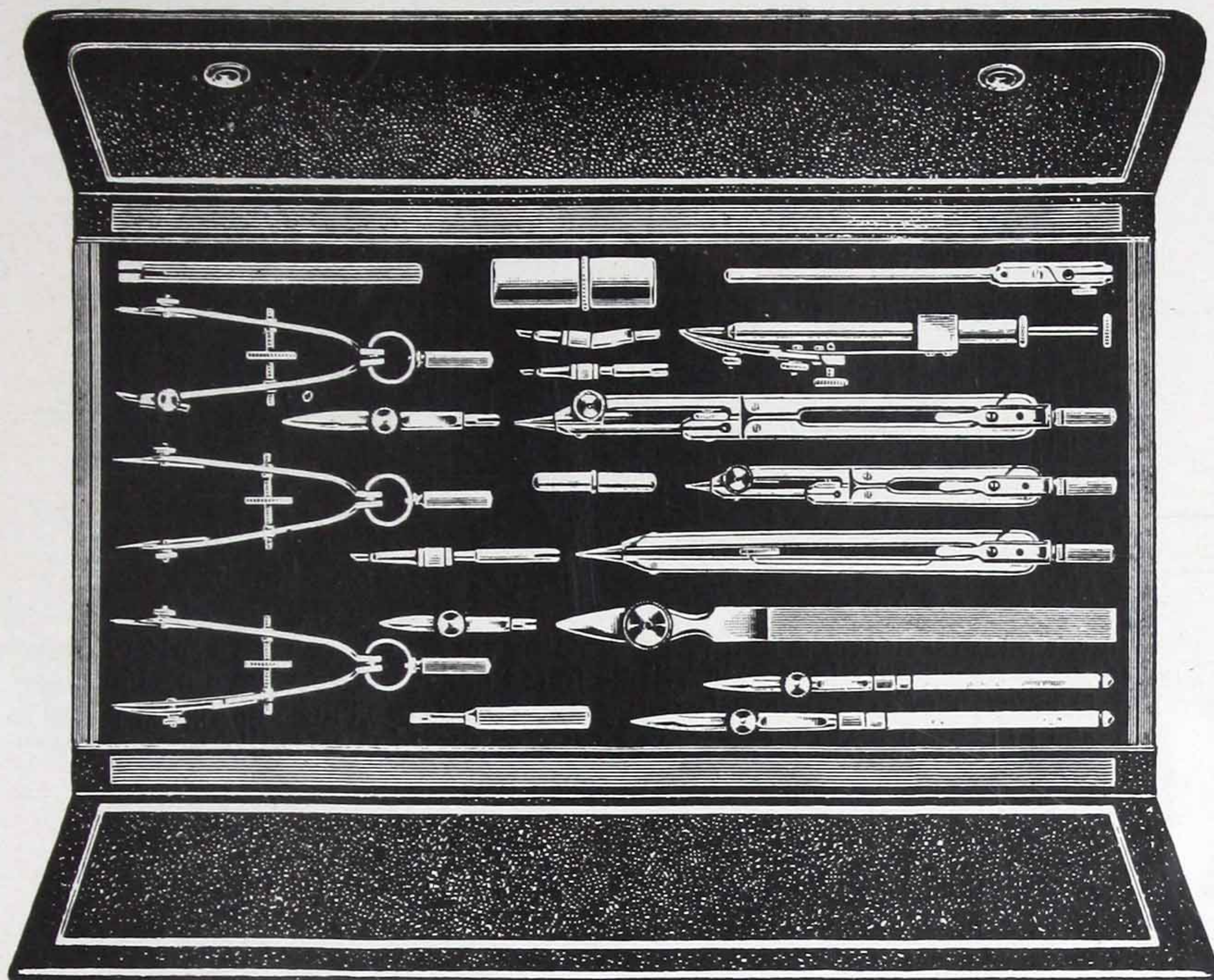
- No. 1840. Ruling Pen, $4\frac{1}{2}$ inch.
- No. 1711. Detail Pen, 6 inch.
- No. 1860. Bow Divider, Center Adjustment, $4\frac{1}{4}$ inch.
- No. 1862. Bow Pen, Center Adjustment, $4\frac{1}{4}$ inch.
- No. 1864. Bow Pencil, Center Adjustment, $4\frac{1}{4}$ inch.
- No. 1881R. Hairspring Divider, $5\frac{3}{4}$ inch.
- No. 1884 $\frac{3}{4}$ R. Compasses, 6 inch, with divider, pen and pencil parts and lengthening bar.
Box with leads, key and complete box of repair parts.
Per Set.....Code Word, **OSTURA**

Dividers and Compasses equipped with straightening device.

SEE PRICE LIST IN BACK OF CATALOG

RELIABLE DRAWING INSTRUMENTS

In Cases



No. 1898

No. 1898. Pocket Book Case, velvet-lined, containing:

- No. 1840.** Ruling Pen, $4\frac{1}{2}$ inch.
- No. 1842.** Ruling Pen, $5\frac{1}{2}$ inch.
- No. 1711.** Detail Pen, 6 inch.
- No. 1860.** Bow Divider, Center Adjustment, $4\frac{1}{4}$ inch.
- No. 1862.** Bow Pen, Center Adjustment, $4\frac{1}{4}$ inch.
- No. 1864.** Bow Pencil, Center Adjustment, $4\frac{1}{4}$ inch.
- No. 1881R.** Hairspring Divider, $5\frac{3}{4}$ inch.
- No. 1884 $\frac{3}{4}$ R.** Compasses, 6 inch, with divider, pen and pencil parts and lengthening bar.
- No. 1882N.** Compasses, 4 inch, with divider, pen and pencil parts.
- No. 1767.** Rotating Drop Bow Instrument with pencil part.
- No. 1685-4.** Combination Key and Lead Box.
Complete Box of Repair Parts.
Per Set.....Code Word, **OZACK**

All Compasses equipped with straightening device.

SEE PRICE LIST IN BACK OF CATALOG

REPAIR KITS

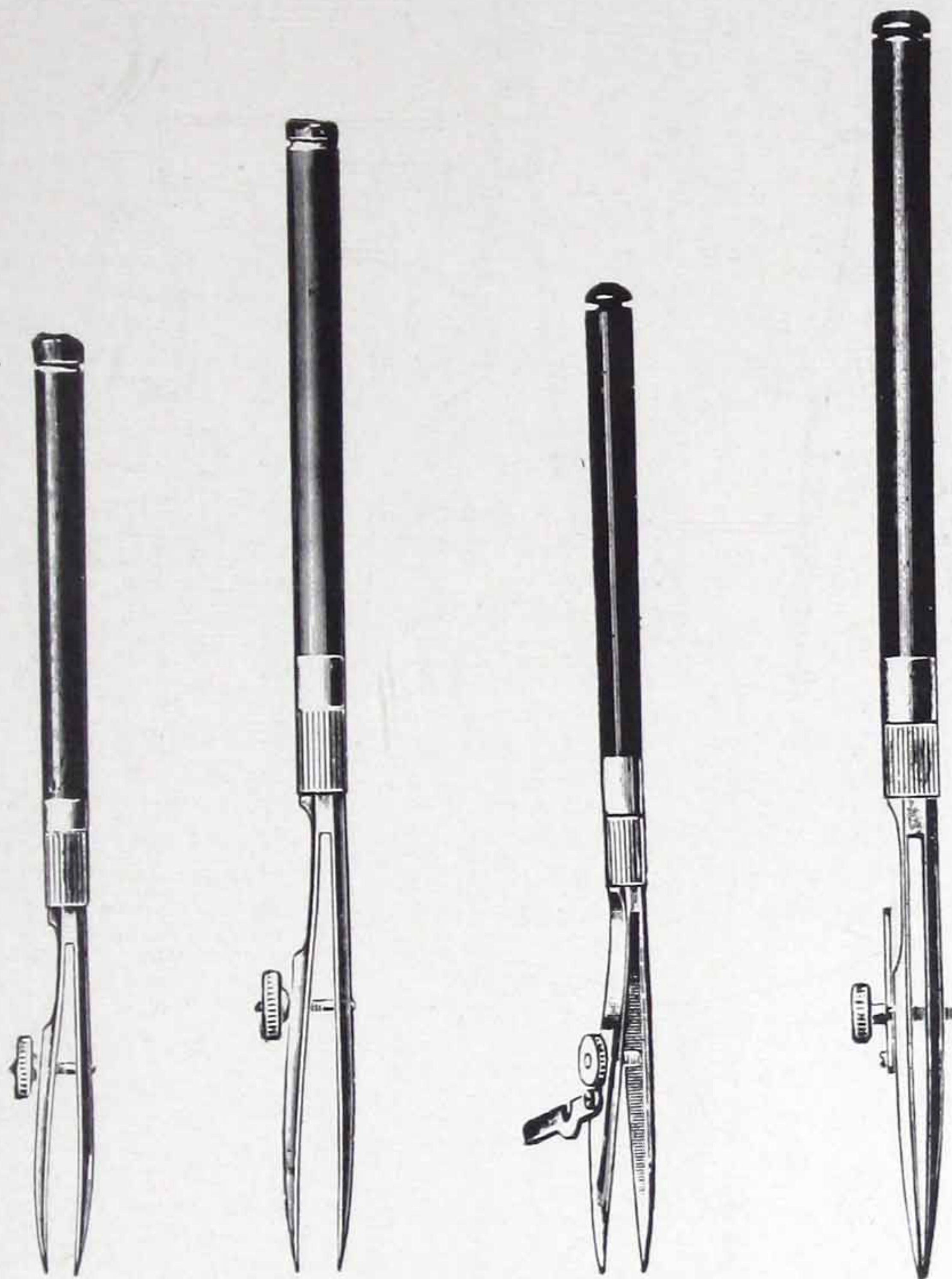


In educational institutions and large drafting rooms where many sets of drawing instruments are constantly in use, it will be found convenient to have on hand one of these repair kits. The cases are velvet-lined and contain numerous repair parts separately packed in small glass jars. Each case also contains a small screw-driver and a pair of tweezers.

	Code Word
No. 1899A. Repair Kit for ZENITH Drawing Instruments.....	OZEBY
No. 1899B. Repair Kit for PEERLESS Drawing Instruments....	OZELL
No. 1899C. Repair Kit for SUPERIOR Drawing Instruments....	OZENO
No. 1899D. Repair Kit for RELIABLE Drawing Instruments....	OZEST
No. 1899E. Repair Kit for UNIVERSAL Drawing Instruments..	OZICK
No. 1899F. Repair Kit for MARVEL Drawing Instruments.....	OZINC
No. 1899G. Repair Kit for BANNER Drawing Instruments.....	OZIO

SEE PRICE LIST IN BACK OF CATALOG

UNIVERSAL DRAWING INSTRUMENTS



No. 1900

No. 1902

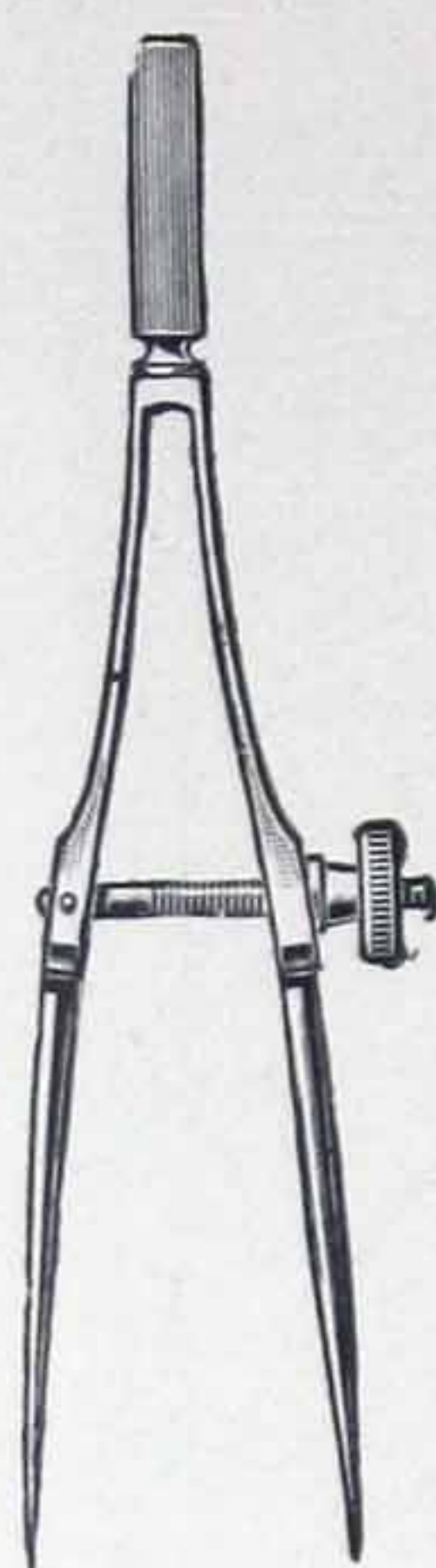
No. 1900C

No. 1902C

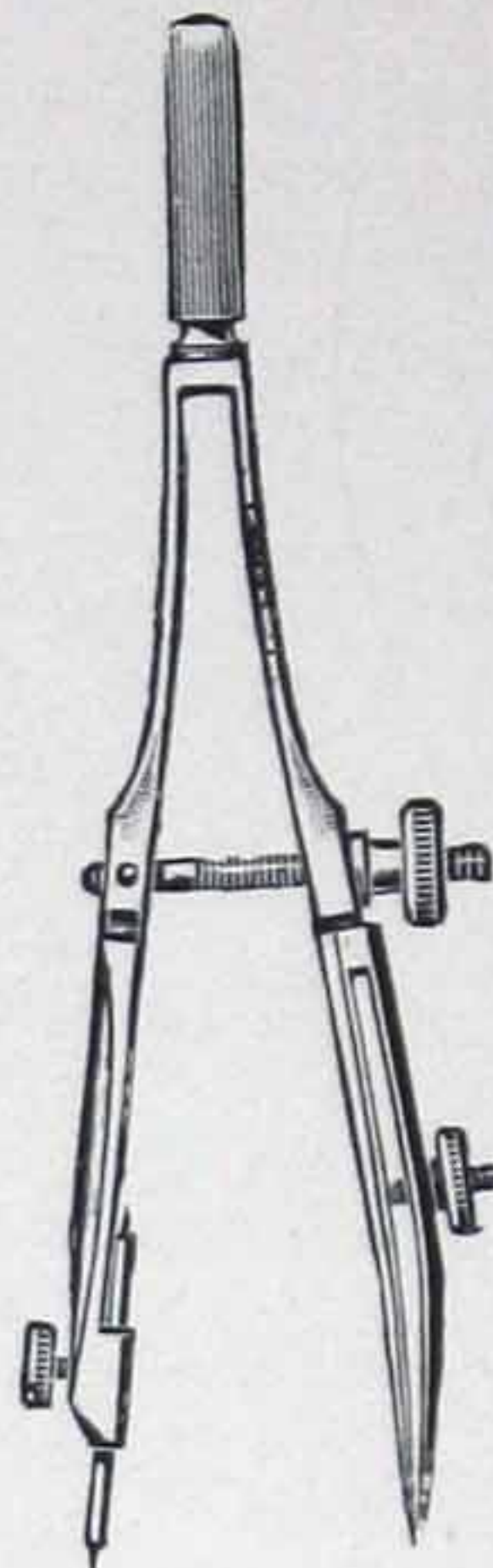
		Code Word
No. 1900.	Ruling Pen, Spring Blade, 4½ inch.....	PABLO
No. 1902.	Ruling Pen, Spring Blade, 5½ inch.....	PABULUM
No. 1900C.	Ruling Pen with release lever, 4½ inch.....	PACA
No. 1902C.	Ruling Pen with release lever, 5½ inch.....	PACHA

SEE PRICE LIST IN BACK OF CATALOG

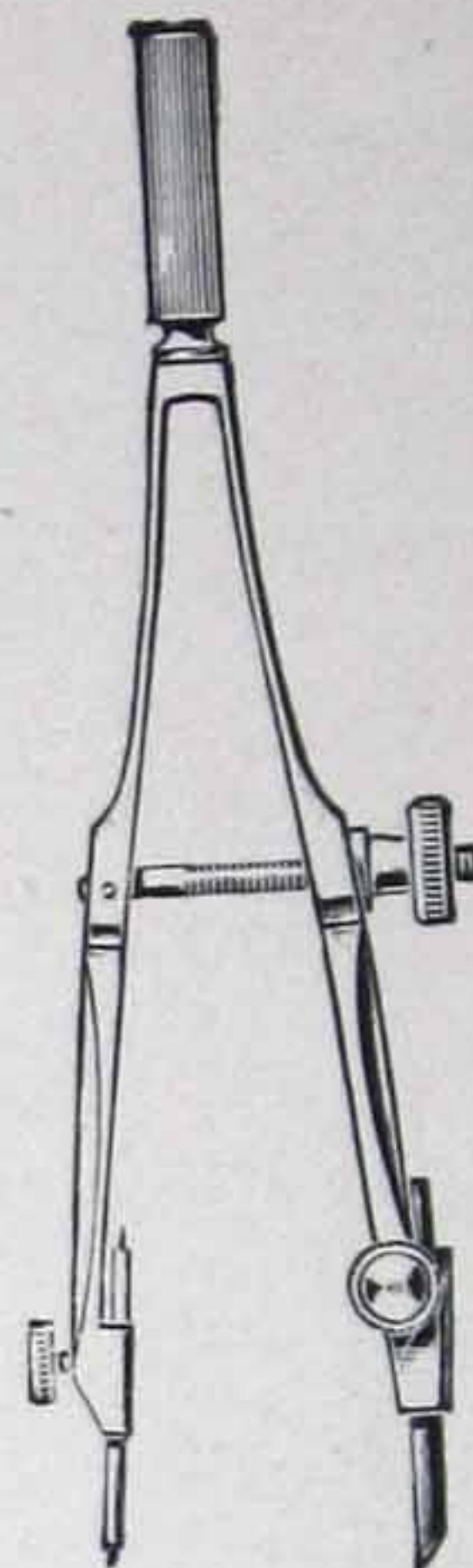
"UNIVERSAL" DRAWING INSTRUMENTS



No. 1910S

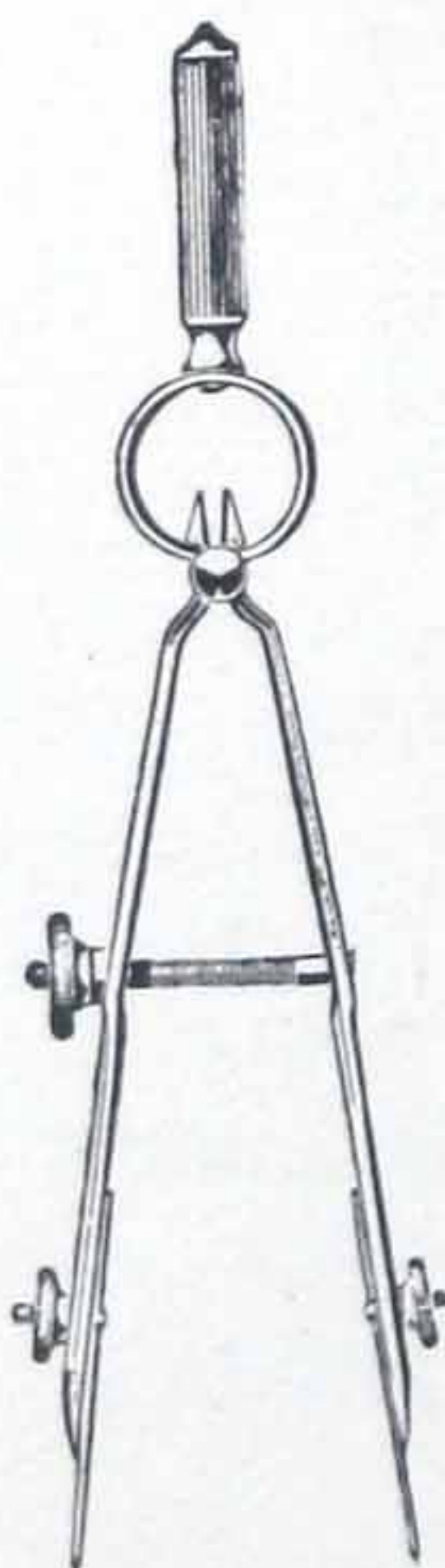


No. 1912S



No. 1914S

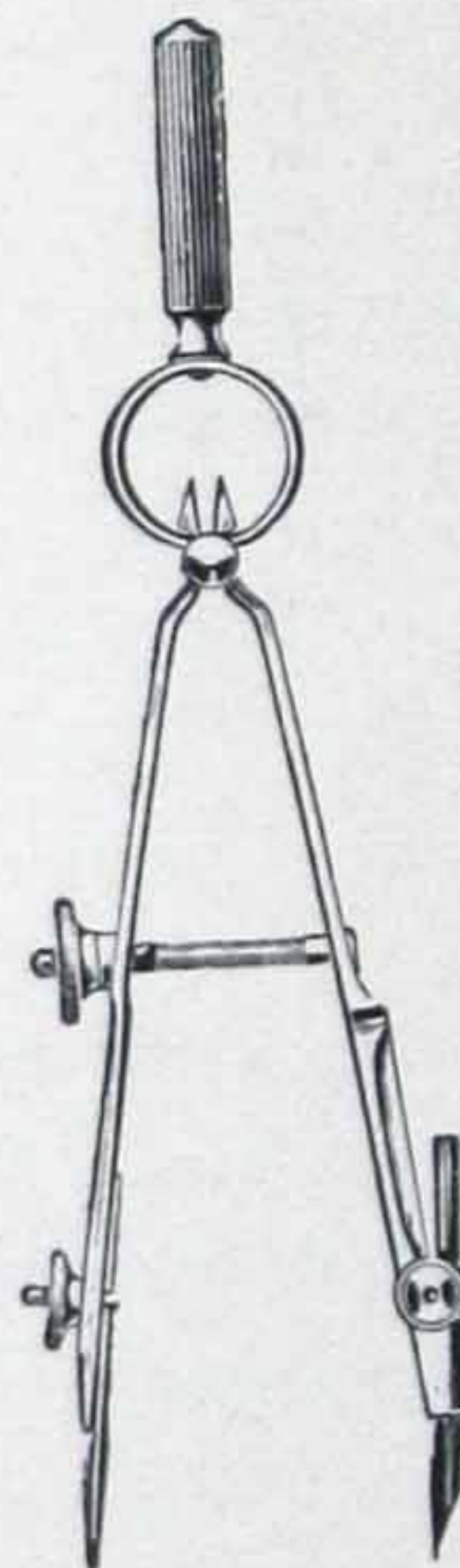
- | | | |
|------------|--|----------------|
| No. 1910S. | Bow Divider, Side Adjustment, 3½ inch..... | Code Word |
| No. 1912S. | Bow Pen, Side Adjustment, 3½ inch..... | PACKER |
| No. 1914S. | Bow Pencil, Side Adjustment, 3½ inch..... | PACKET |
| | | PADDING |



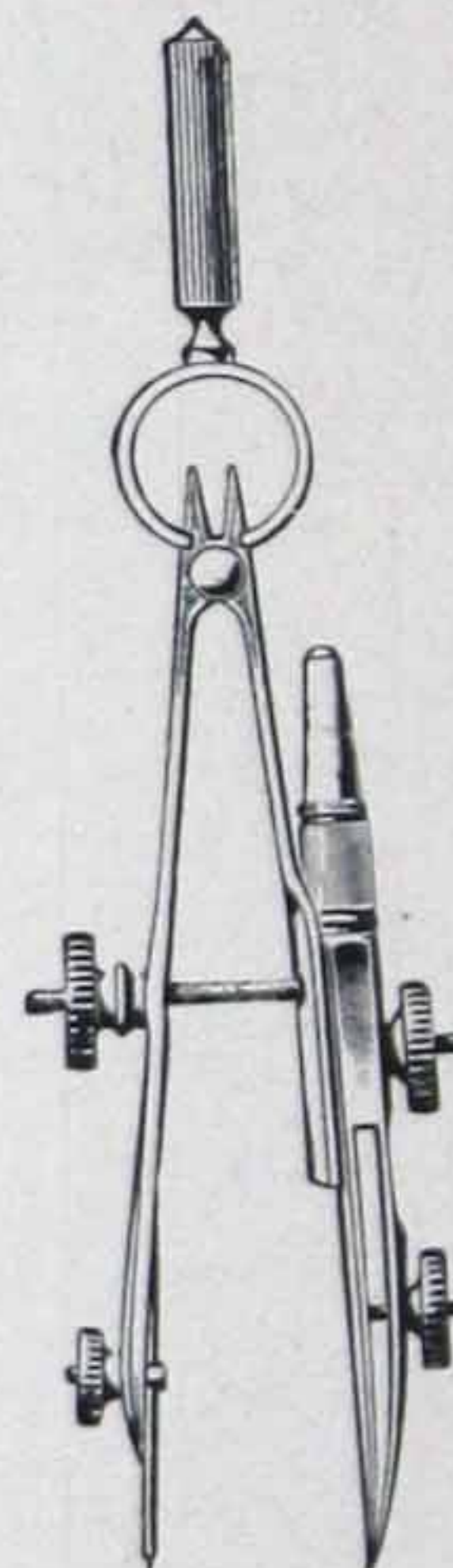
No. 1910R



No. 1912R



No. 1914R

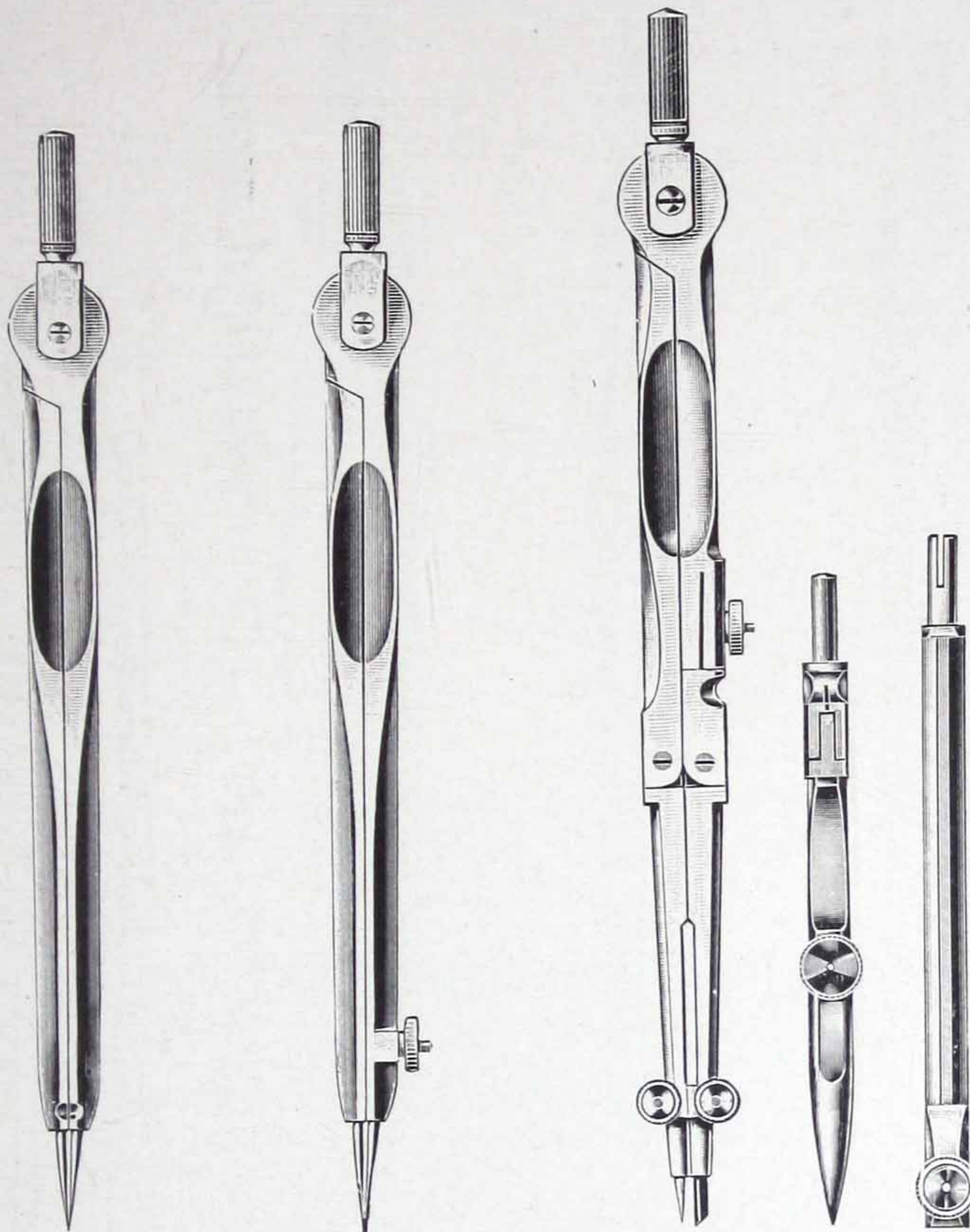


No. 1915R

- | | | |
|------------|--|----------------|
| No. 1910R. | Annular Spring Bow Divider, Side Adjustment, 3½ inch..... | Code Word |
| No. 1912R. | Annular Spring Bow Pen, Side Adjustment, 3½ inch..... | PACO |
| No. 1914R. | Annular Spring Bow Pencil, Side Adjustment, 3½ inch..... | PADDLE |
| No. 1915R. | Annular Spring Bow Combination Pen and Pencil, Side Adjustment, 3½ inch..... | PADDOCK |
| | | PADRONE |

SEE PRICE LIST IN BACK OF CATALOG

"UNIVERSAL" DRAWING INSTRUMENTS



No. 1930-2S

No. 1931S

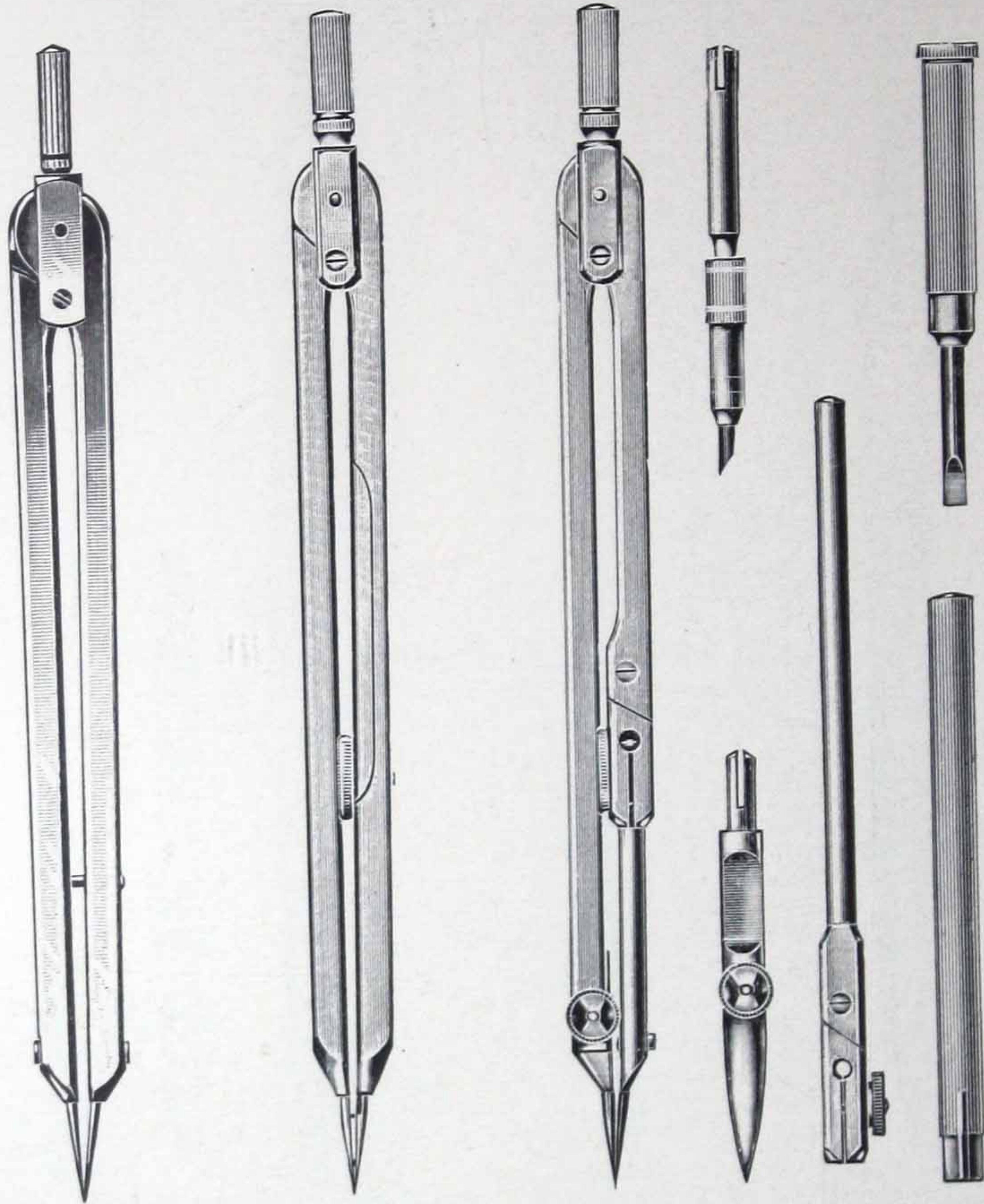
No. 1934 $\frac{3}{4}$ S

- | | | |
|---------------------------|--|---------------------------|
| No. 1930-2S. | Plain Divider, 6 inch..... | Code Word
PAGAN |
| No. 1931S. | Hairspring Divider, 6 inch..... | PAGEANT |
| No. 1934 $\frac{3}{4}$ S. | Compasses, 6 inch, with fixed needle point, pen
and pencil parts and lengthening bar..... | PAGER |

All Dividers and Compasses equipped with straightening device.

SEE PRICE LIST IN BACK OF CATALOG

MARVEL DRAWING INSTRUMENTS



No. 1930-2R

No. 1931R

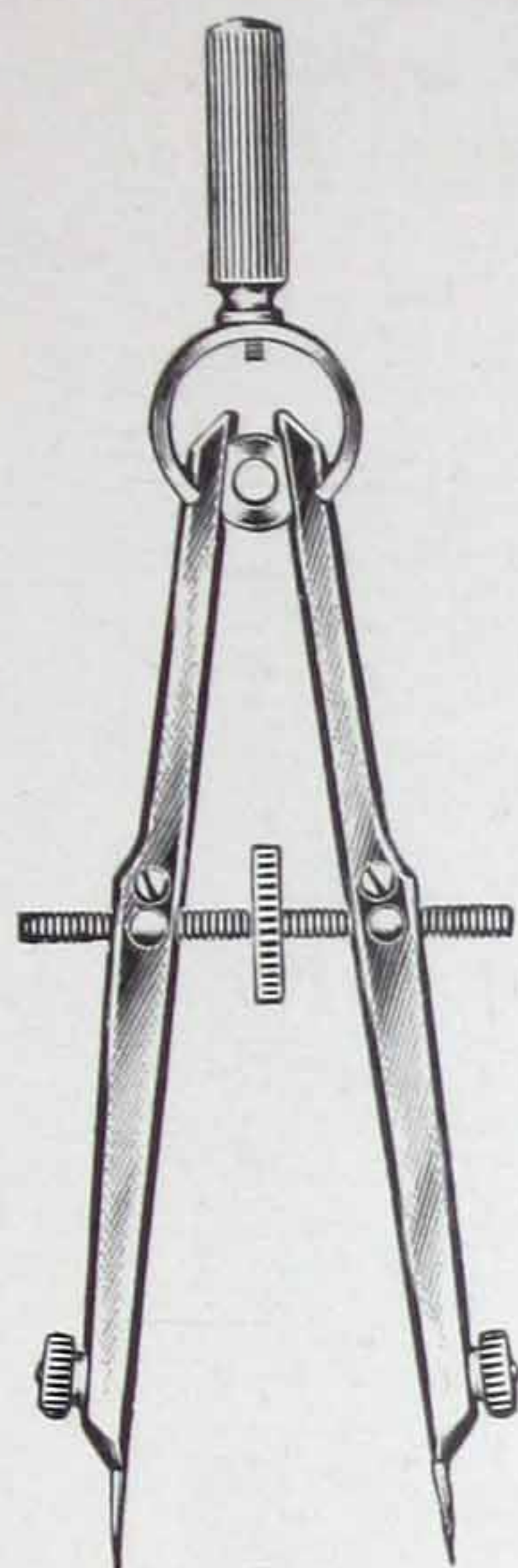
No. 1934³/₄R

No. 1930-2R.	Plain Divider, 6 inch.....	Code Word PAHAG
No. 1931R.	Hairspring Divider, 6 inch.....	PAHACK
No. 1934 ³ / ₄ R.	Compasses, 6 inch, with reversible needle point, divider, pen and pencil parts and lengthening bar..	PAHARP

All Dividers and Compasses equipped with straightening device.

SEE PRICE LIST IN BACK OF CATALOG

"UNIVERSAL" DRAWING INSTRUMENTS



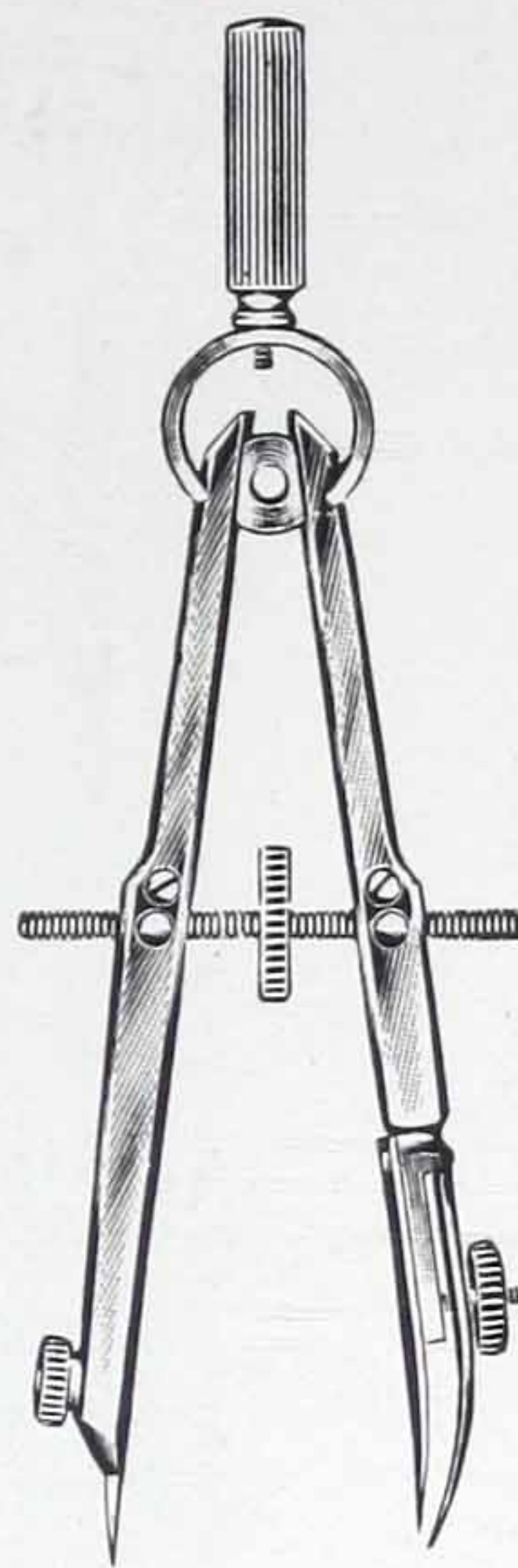
No. 1950



No. 1940

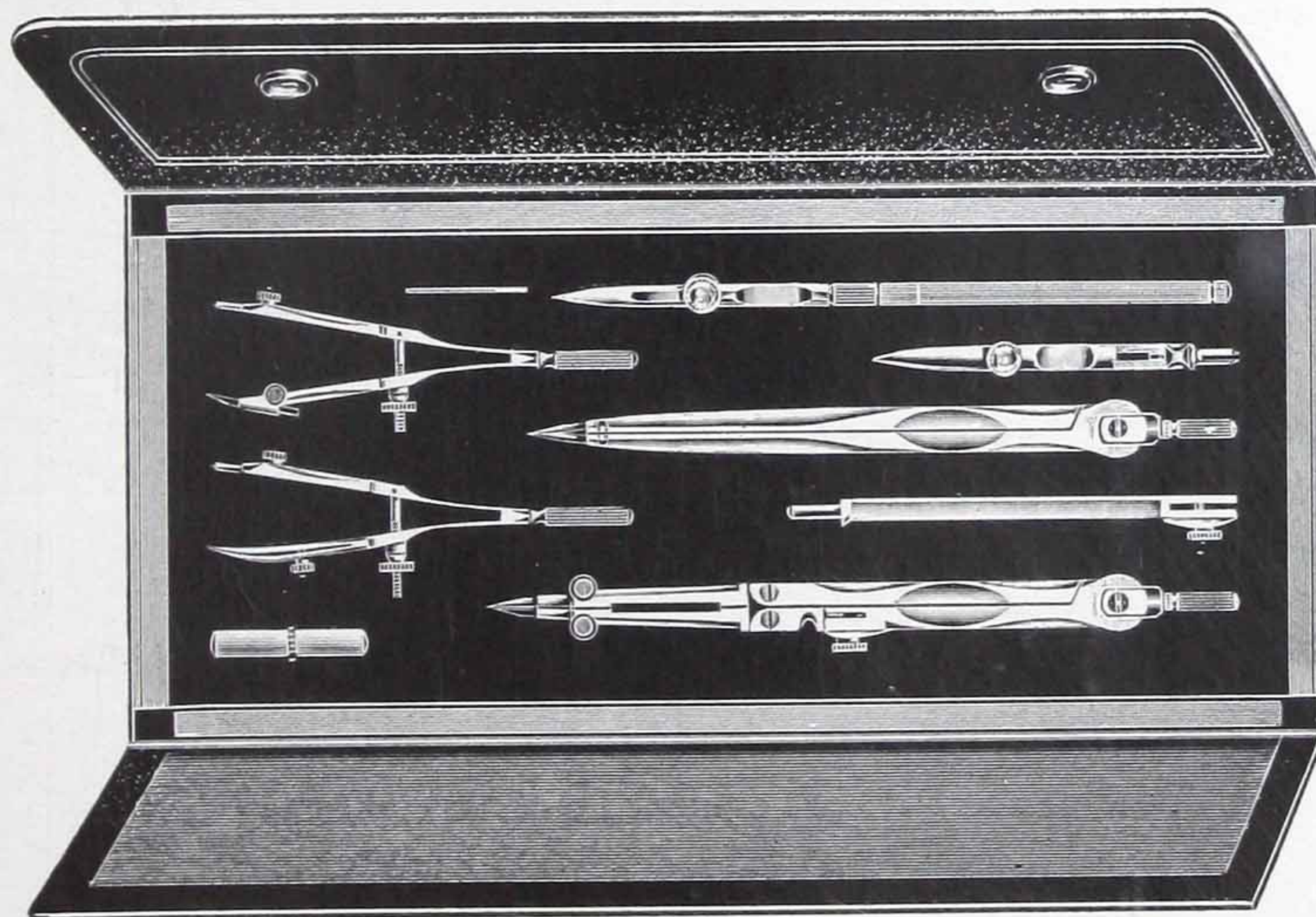


No. 1942



No. 1952

- | | | |
|-----------|--|-----------|
| No. 1940. | Annular Spring Bow Divider, Center Adjustment, 3 1/2 inch. | Code Word |
| No. 1942. | Annular Spring Bow Pen, Center Adjustment, 3 1/2 inch. | PAHELD |
| No. 1944. | Annular Spring Bow Pencil, Center Adjustment, 3 1/2 inch. | PAHEN |
| No. 1950. | Annular Spring Bow Divider, Center Adjustment, 4 1/4 inch. | PAHEST |
| No. 1952. | Annular Spring Bow Pen, Center Adjustment, 4 1/4 inch. | PAHETE |
| No. 1954. | Annular Spring Bow Pencil, Center Adjustment, 4 1/4 inch. | PAHETECH |
| | | PAHETIRE |

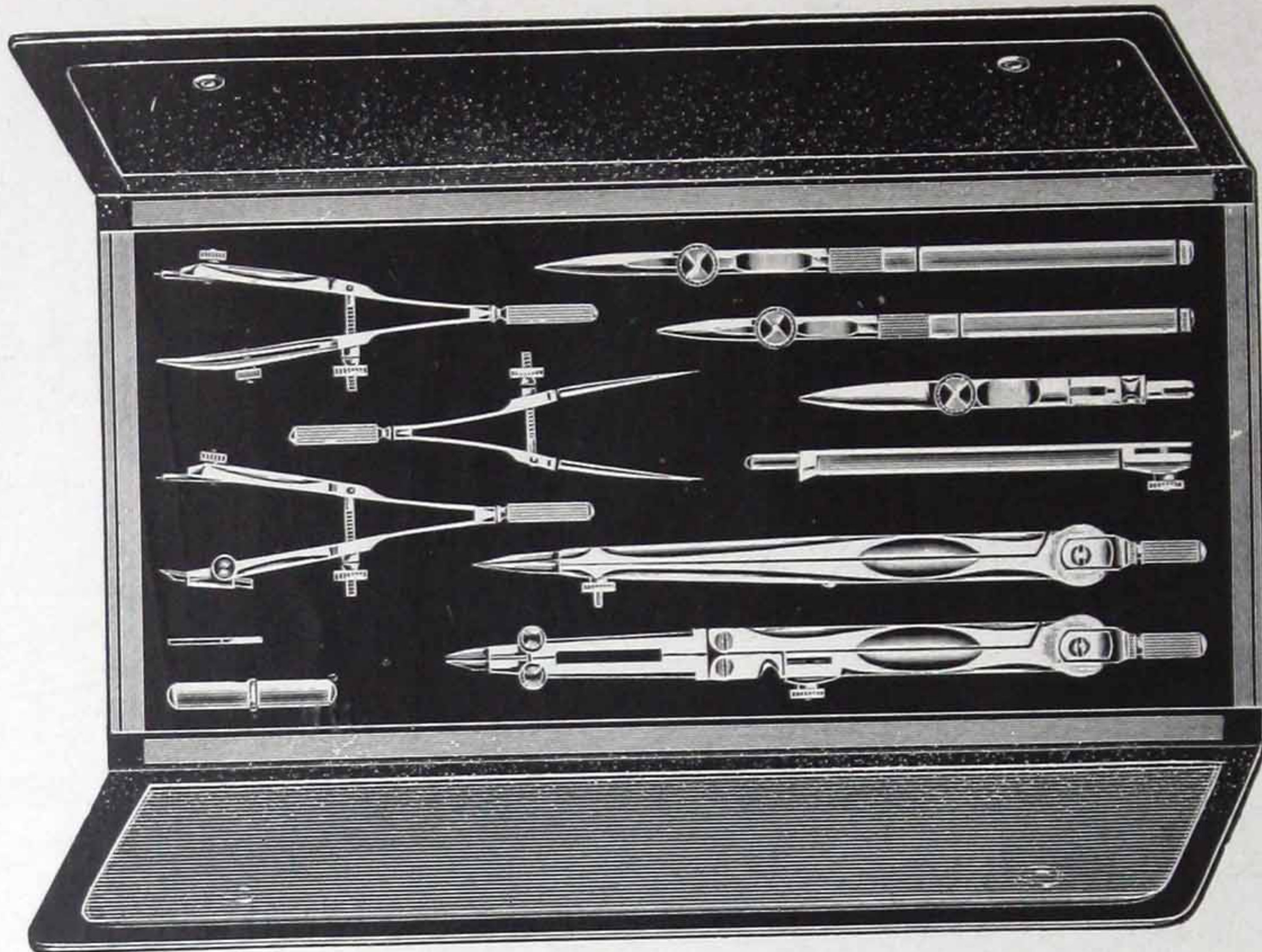


No. 1953S

- No. 1953S. Pocket Book Case, velvet-lined, containing:
- No. 1902. Ruling Pen, 5 1/2 inch.
 - No. 1912S. Bow Pen, Side Adjustment, 3 1/2 inch.
 - No. 1914S. Bow Pencil, Side Adjustment, 3 1/2 inch.
 - No. 1930-2S. Plain Divider, 6 inch.
 - No. 1934 3/4 S. Compasses, 6 inch, with pen and pencil parts and lengthening bar.
- Box with leads, key and complete box of repair parts.
Per Set.....Code Word, **PALENGA**
All Dividers and Compasses with straightening device.

UNIVERSAL DRAWING INSTRUMENTS

In Cases



No. 1955S

No. 1955S. Pocket Book Case, velvet-lined, containing:

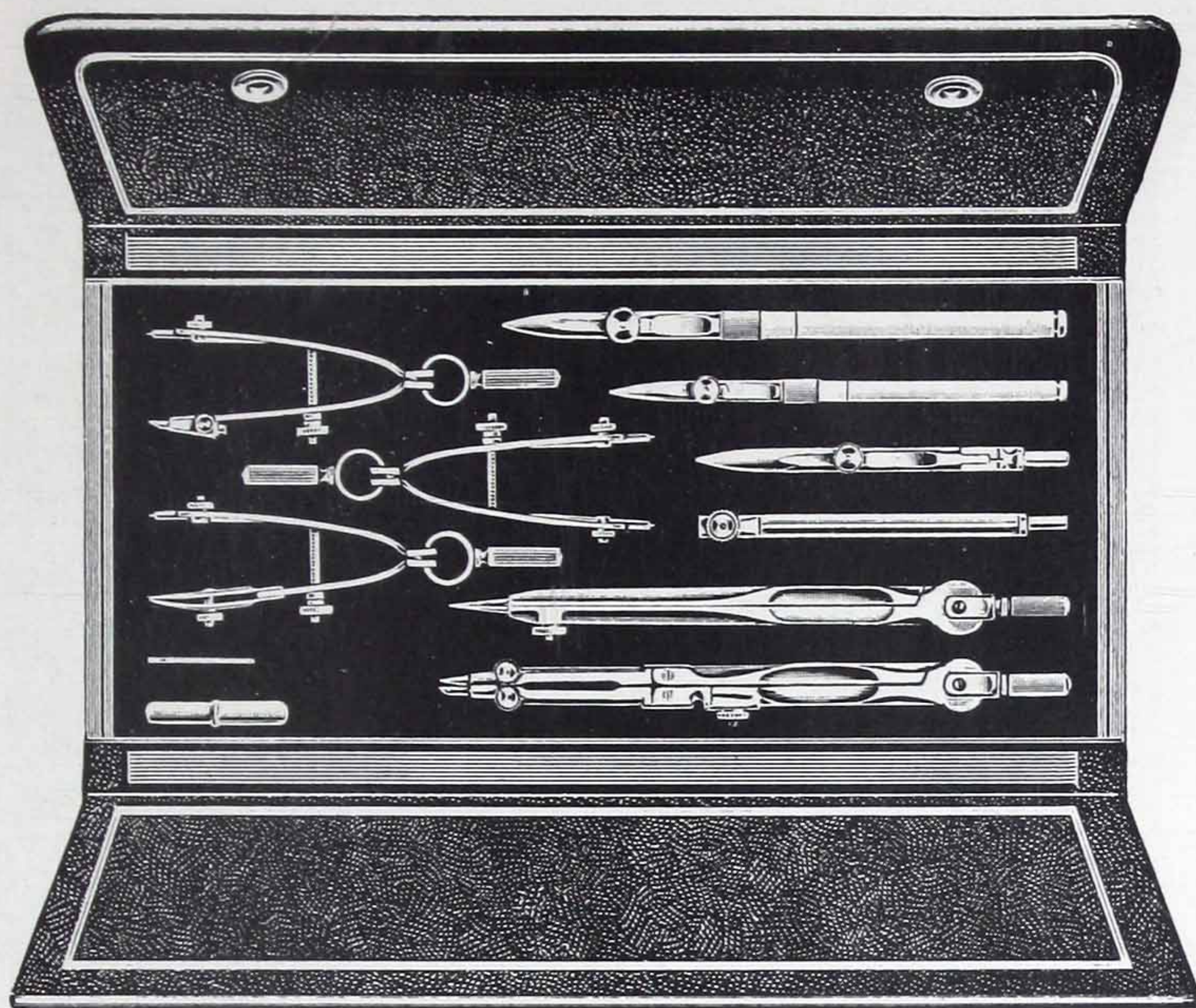
- No. 1900.** Ruling Pen, $4\frac{1}{2}$ inch.
- No. 1902.** Ruling Pen, $5\frac{1}{2}$ inch.
- No. 1910S.** Bow Divider, Side Adjustment, $3\frac{1}{2}$ inch.
- No. 1912S.** Bow Pen, Side Adjustment, $3\frac{1}{2}$ inch.
- No. 1914S.** Bow Pencil, Side Adjustment, $3\frac{1}{2}$ inch.
- No. 1931S.** Hairspring Divider, 6 inch.
- No. 1934 $\frac{3}{4}$ S.** Compasses, 6 inch, with pen and pencil parts and lengthening bar.
Box with leads, key and complete box of repair parts.
Per Set.....Code Word, **POLITON**

Compasses and Dividers equipped with straightening device.

SEE PRICE LIST IN BACK OF CATALOG

UNIVERSAL DRAWING INSTRUMENTS

In Cases



No. 1955R

No. 1955R. Pocket Book Case, velvet-lined, containing:

No. 1900. Ruling Pen, 4½ inch.

No. 1902. Ruling Pen, 5½ inch.

No. 1910R. Annular Spring Bow Divider, Side Adjustment, 3½ inch.

No. 1912R. Annular Spring Bow Pen, Side Adjustment, 3½ inch.

No. 1914R. Annular Spring Bow Pencil, Side Adjustment, 3½ inch.

No. 1931S. Hairspring Divider, 6 inch.

No. 1934¾S. Compasses, 6 inch, with pen and pencil parts and lengthening bar.

Box with leads, key and complete box of repair parts.

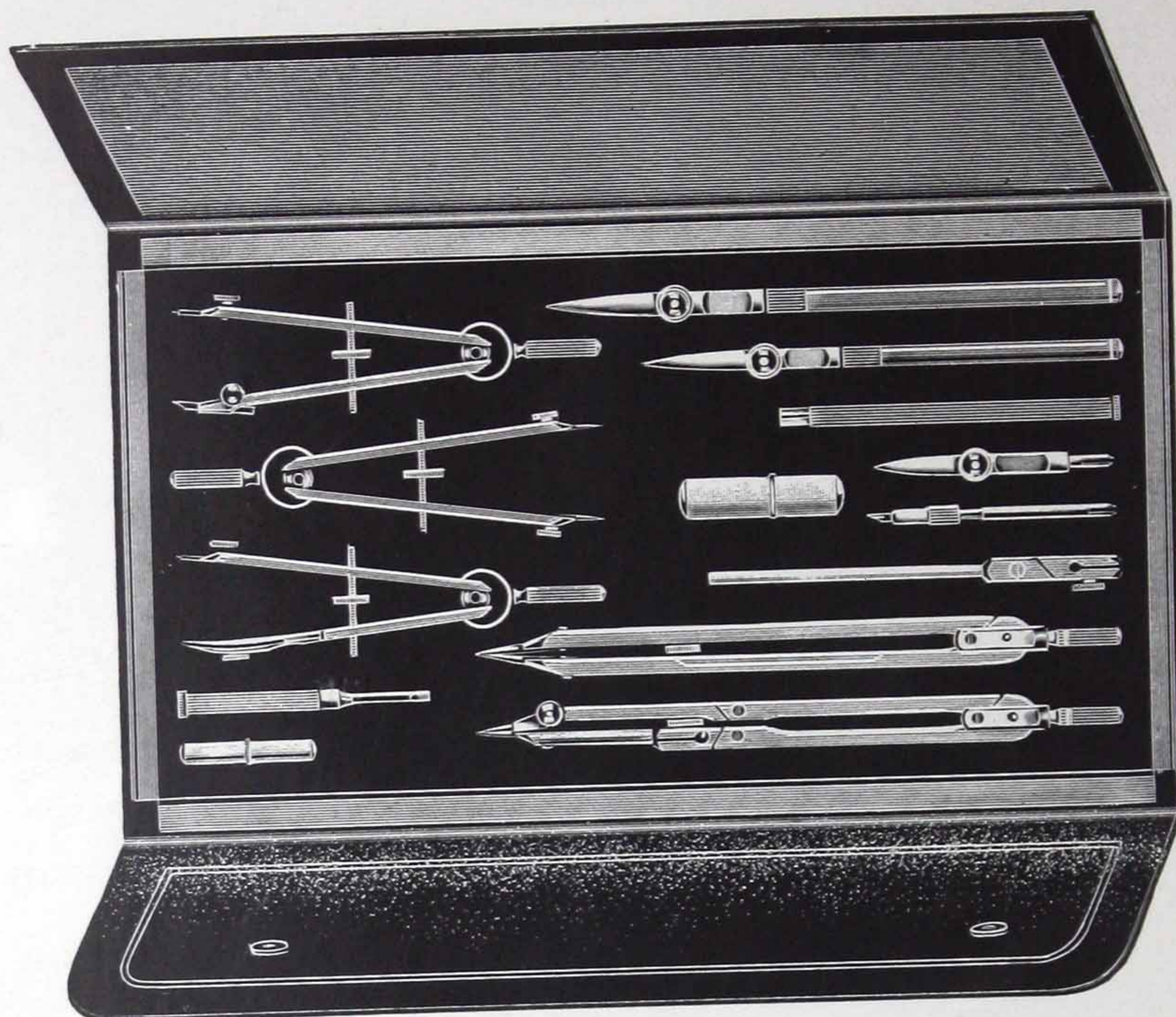
Per Set.....Code Word, **PALERT**

Dividers and Compasses equipped with straightening device.

SEE PRICE LIST IN BACK OF CATALOG

MARVEL DRAWING INSTRUMENTS

In Cases



No. 1959N

No. 1959N. Pocket Book Case, velvet-lined, containing:

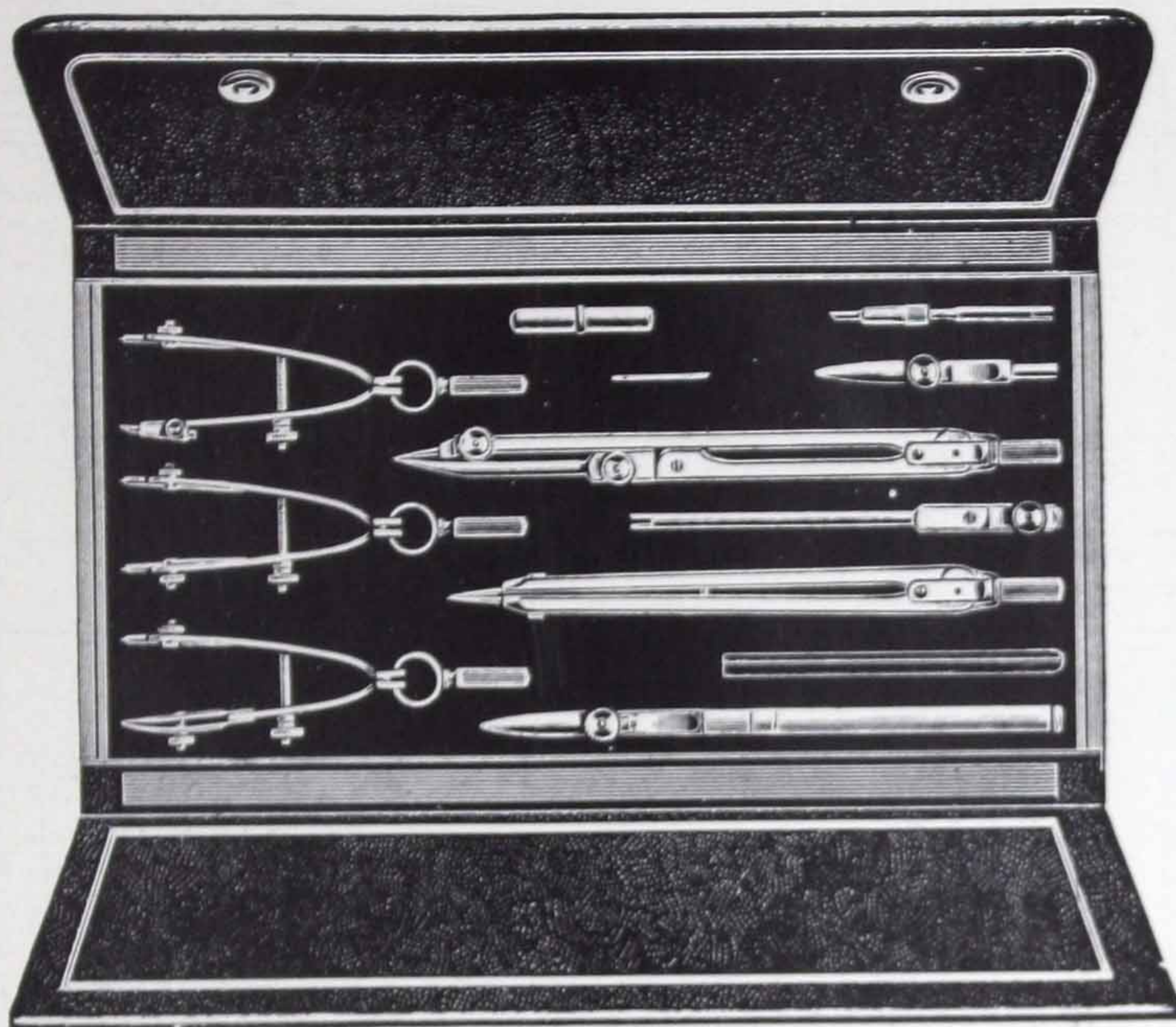
- No. 1900. Ruling Pen, $4\frac{1}{2}$ inch.
- No. 1902. Ruling Pen, $5\frac{1}{2}$ inch.
- No. 1950. Annular Spring Bow Divider, Center Adjustment, $4\frac{1}{4}$ inch.
- No. 1952. Annular Spring Bow Pen, Center Adjustment, $4\frac{1}{4}$ inch.
- No. 1954. Annular Spring Bow Pencil, Center Adjustment, $4\frac{1}{4}$ inch.
- No. 1930-2R. Plain Divider, 6 inch.
- No. 1934 $\frac{3}{4}$ R. Compasses, 6 inch, with divider, pen and pencil parts and lengthening bar.
Box with leads, key and complete box of repair parts.
Per Set.....Code Word, **PALMIX**

Dividers and Compasses equipped with straightening device.

SEE PRICE LIST IN BACK OF CATALOG

MARVEL DRAWING INSTRUMENTS

In Cases



No. 1965R

No. 1965R. Pocket Book Case, velvet-lined, containing:

No. 1902. Ruling Pen, 5½ inch.

No. 1910R. Annular Spring Bow Divider, Side Adjustment, 3½ inch.

No. 1912R. Annular Spring Bow Pen, Side Adjustment, 3½ inch.

No. 1914R. Annular Spring Bow Pencil, Side Adjustment, 3½ inch.

No. 1930-2R. Plain Divider, 6 inch.

No. 1934¾R. Compasses, 6 inch, with divider, pen and pencil parts and lengthening bar.

Box with leads, key and complete box of repair parts.

Per Set.....Code Word, **PEONA**

No. 1965S. Same Set as No. 1965R but with bow instruments Nos. 1910S, 1912S and 1914S instead of annular spring bows.

Per Set.....Code Word, **PEOREX**

No. 1965N. Same Set as No. 1965R but with center adjustment bow instruments Nos. 1940, 1942 and 1944 instead of bow instruments with side adjustment.

Per Set.....Code Word, **PEOSIA**

Compasses and Dividers equipped with straightening device.

SEE PRICE LIST IN BACK OF CATALOG

BANNER DRAWING INSTRUMENTS



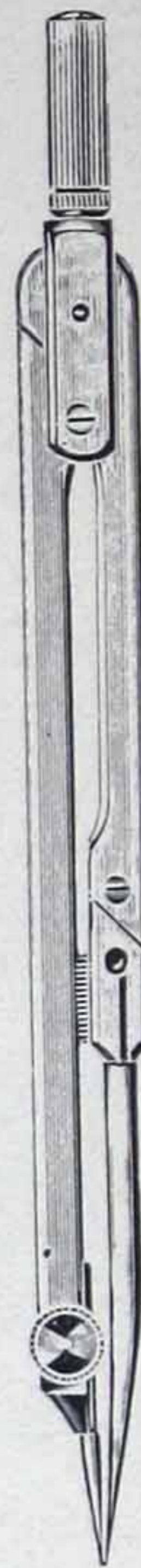
No. 1960



No. 1960C



No. 1960-2R



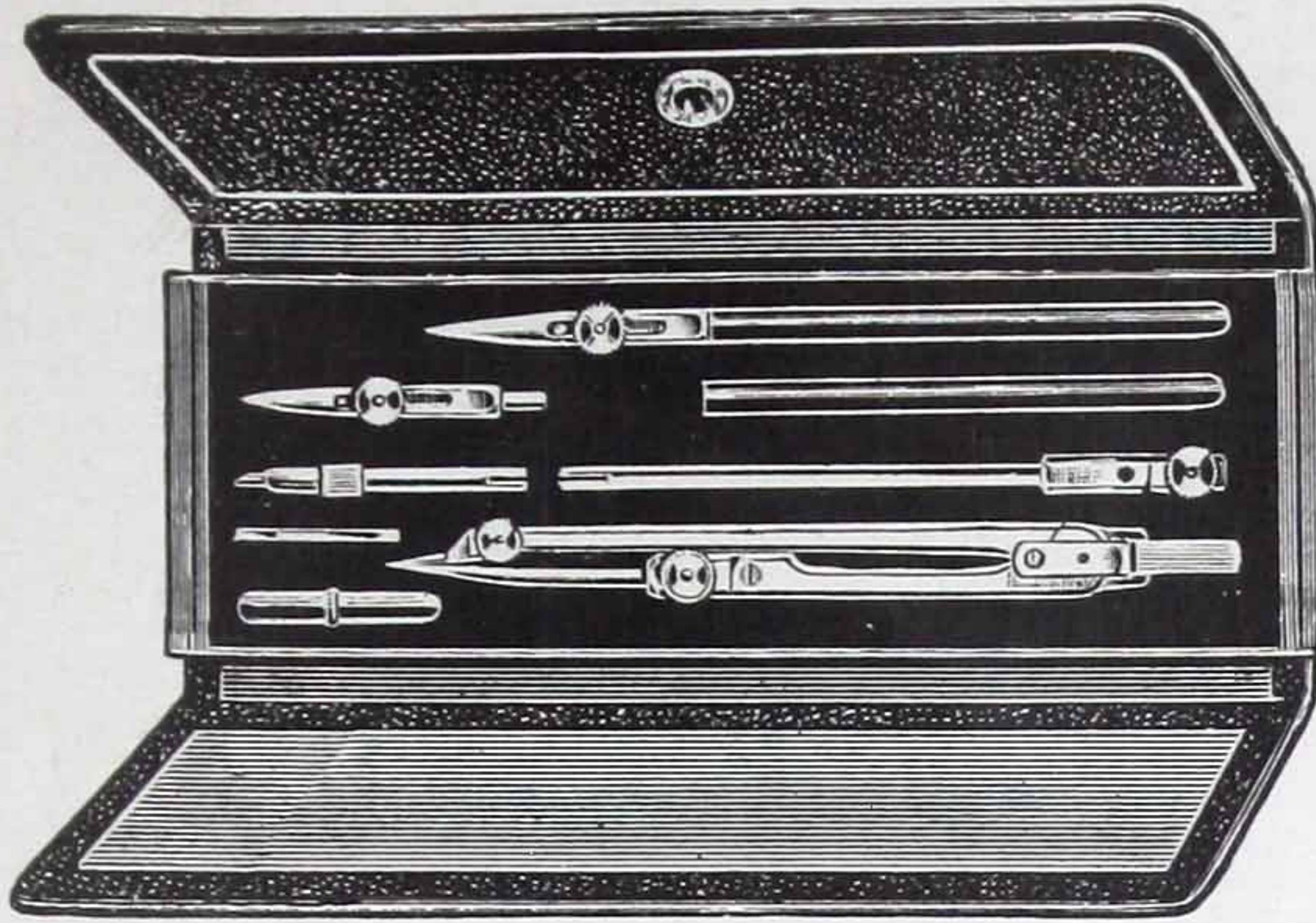
No. 1964 $\frac{3}{4}$ R

No. 1960.	Ruling Pen, Metal Handle, 5 inch.....	Code Word PELLAGRA
No. 1960C.	Ruling Pen with release lever, 5 inch.....	PELLAM
No. 1960-2R.	(Old No. 1961G) Plain Divider, 5 inch.....	PELLET
No. 1964 $\frac{3}{4}$ R.	(Old No. 1964G) Compasses, 5 $\frac{1}{2}$ inch, reversible needle point, divider, pen and pencil parts and lengthening bar.....	PELLICLE
Compasses and Dividers equipped with straightening device.		

SEE PRICE LIST IN BACK OF CATALOG

BANNER DRAWING INSTRUMENTS

In Cases



No. 1961R

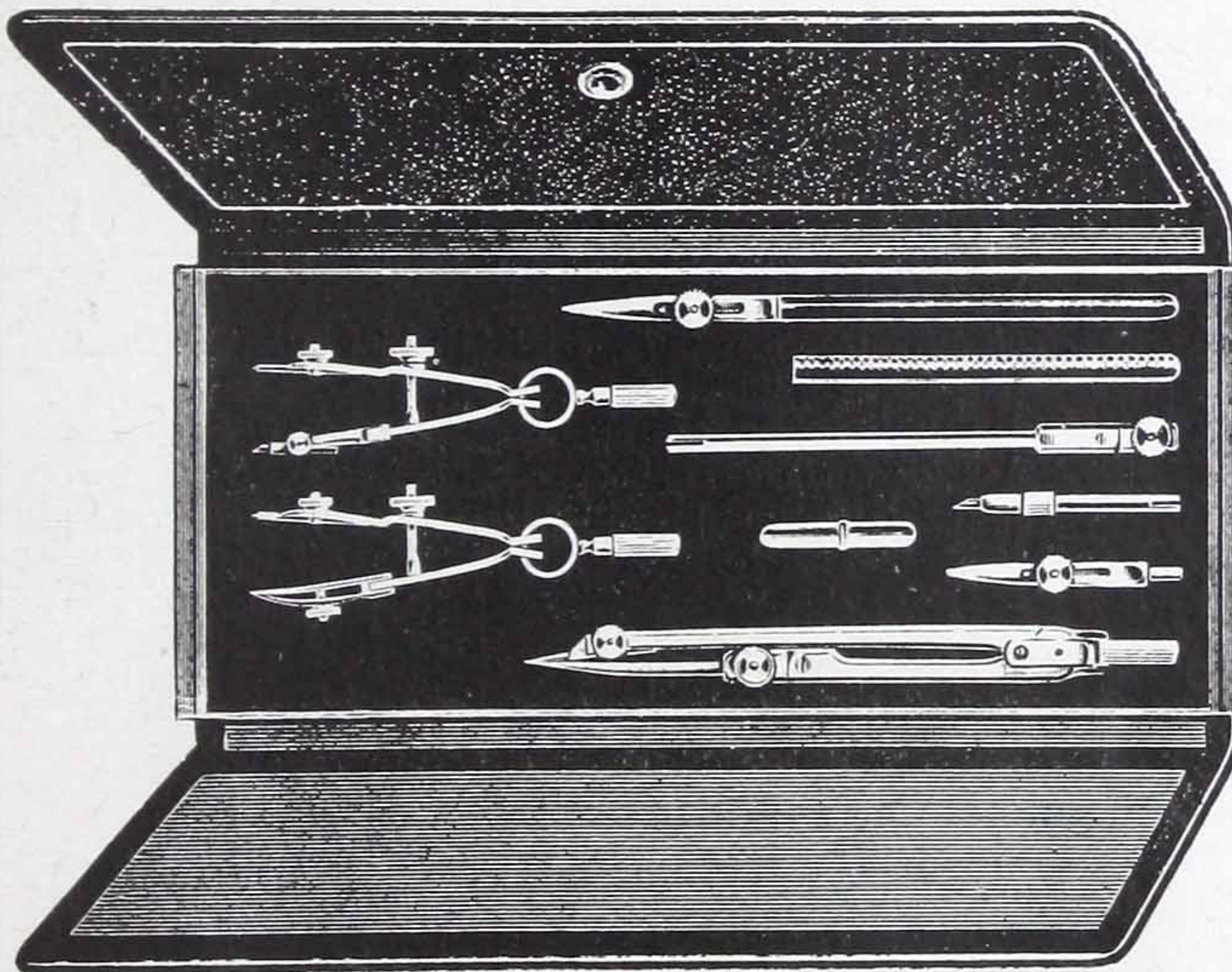
No. 1961R. Pocket Book Case, velvet-lined, containing:

No. 1960. Ruling Pen, 5 inch.

No. 1964 $\frac{3}{4}$ R. Compasses, 5 $\frac{1}{2}$ inch, with divider, pen and pencil parts and lengthening bar.

Box with leads, key and complete box of repair parts.

Per Set.....Code Word, **PROCTOR**



No. 1968R

No. 1968R. Pocket Book Case, velvet-lined, containing:

No. 1960. Ruling Pen, 5 inch.

No. 1912R. Annular Spring Bow Pen, Side Adjustment, 3 $\frac{1}{2}$ inch.

No. 1914R. Annular Spring Bow Pencil, Side Adjustment, 3 $\frac{1}{2}$ inch.

No. 1964 $\frac{3}{4}$ R. Compasses, 5 $\frac{1}{2}$ inch, with divider, pen and pencil parts and lengthening bar.

Box with leads, key and complete box of repair parts.

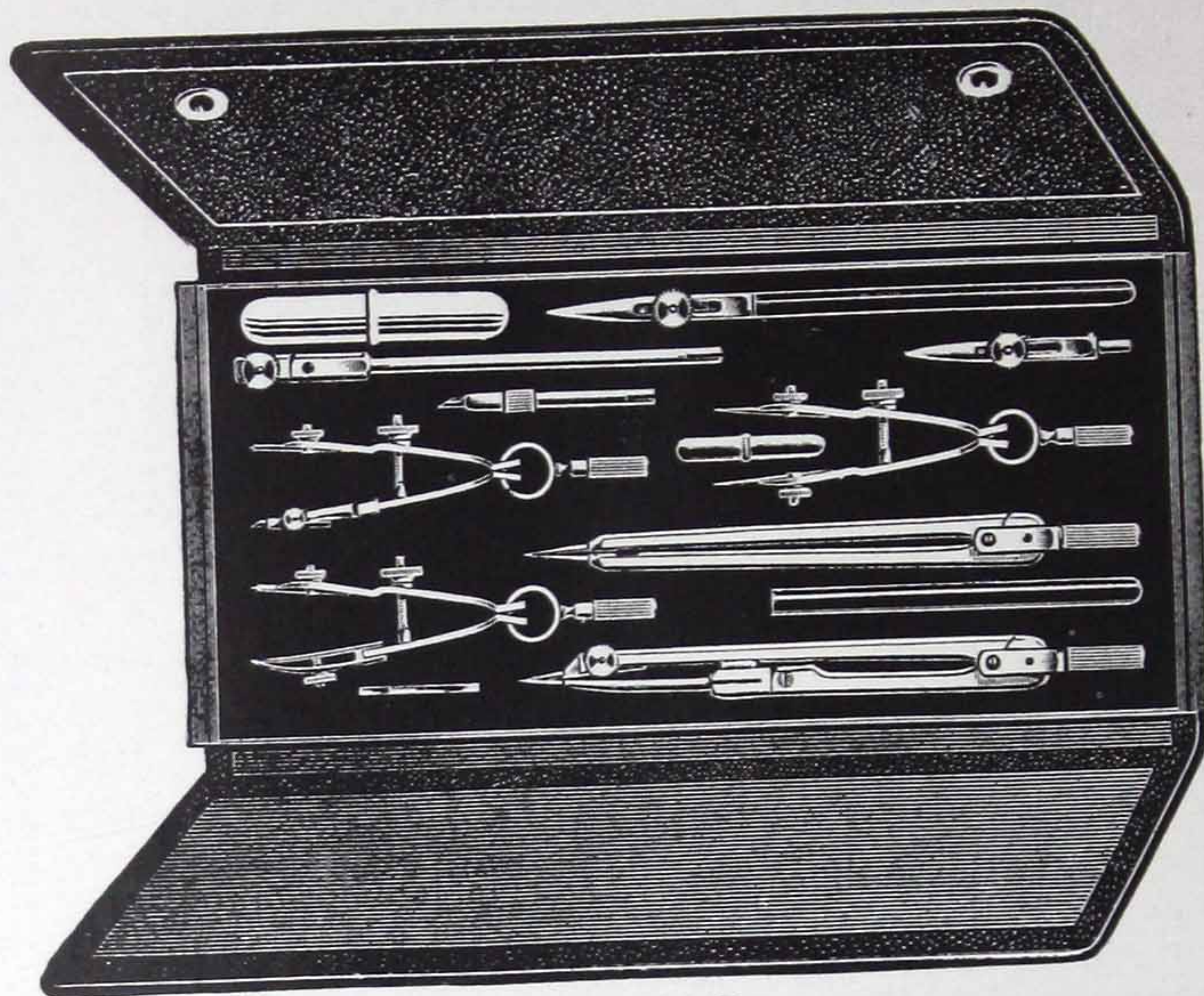
Per Set.....Code Word, **PINDER**

Dividers and Compasses equipped with straightening device.

SEE PRICE LIST IN BACK OF CATALOG

BANNER DRAWING INSTRUMENTS

In Cases



No. 1969R

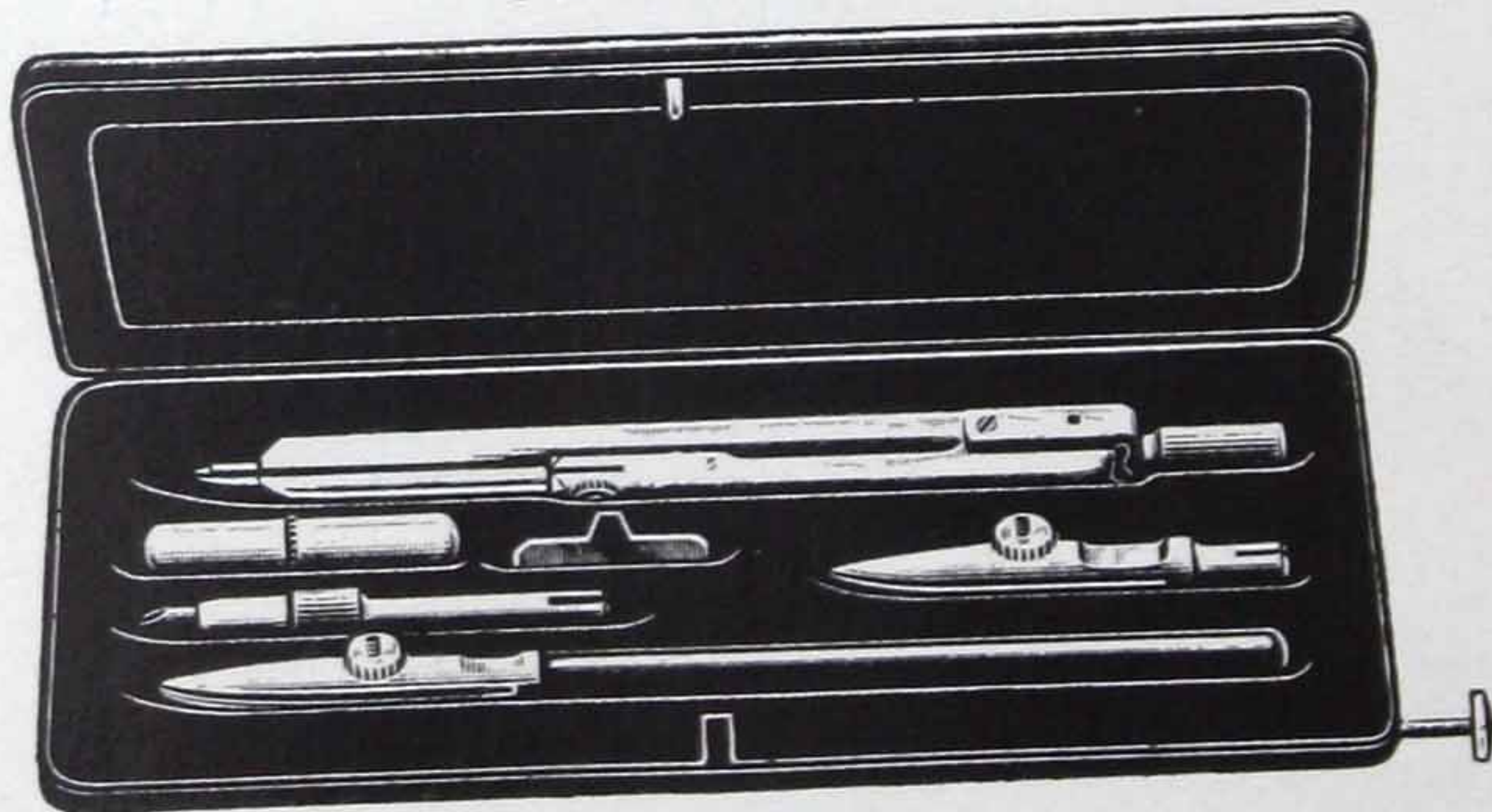
No. 1969R. Pocket Book Case, velvet-lined, containing:

- No. 1960.** Ruling Pen, 5 inch.
- No. 1910R.** Annular Spring Bow Divider, Side Adjustment, 3½ inch.
- No. 1912R.** Annular Spring Bow Pen, Side Adjustment, 3½ inch.
- No. 1914R.** Annular Spring Bow Pencil, Side Adjustment, 3½ inch.
- No. 1960-2R.** Plain Divider, 5 inch.
- No. 1964¾R.** Compasses, 5½ inch, with divider, pen and pencil parts and lengthening bar.

Box with leads, key and complete box of repair parts.
Per Set.....Code Word, **PINTO**

Compasses and Dividers equipped with straightening device.

COMPASS SET



No. 1962BL

No. 1962BL. School Compass Set. Highly polished brass drawing instruments with steel pens and points, in velvet lined Bar Lock Case.....Code Word, **PILGRIM**

SEE PRICE LIST IN BACK OF CATALOG

EXTRA PARTS

For "SUPERIOR," "RELIABLE," "UNIVERSAL," "MARVEL" and
"BANNER" Drawing Instruments.

For Ruling Pens

- No. 1985A. Screw or bolt and nut for pens.....
B. Slide Catch Device for pens.....
C. Handles for Pens, Ebony or Aluminum.....

For Bow Instruments

- No. 1985D. Adjusting nut for side screw type (nut only).....
E. Bolt or spindle for side screw type (without nut).....
F. Center Wheel Assembly, complete.....
G. Clamp Nuts and Bolts for needle points.....
H. Clamp Screws for Pencil Points.....
I. Screw or bolt and nut for pen points.....
J. German Silver Handle for Bow Instruments.....

For Dividers

- No. 1985K. Nut and Bolt for hairspring adjustment.....
L. Clamp Nuts and Bolts for Needle Points.....

For Compasses

- No. 1985M. Clamp Screws to hold Pen or Pencil Parts.....
N. Clamp Screws to hold Needle or Lead.....
O. Screw or bolt and nut for pens.....
P. Headscrews for Compasses.....
Q. Straightening Device for Compasses.....
R. German Silver Handle for Compasses.....
S. Pencil Part, complete.....
T. Pen Part, complete.....
U. Lengthening Bar, complete.....
W. Divider Part, complete.....

Miscellaneous Parts

No. 1985—
Part No.

- 4 Combination Key and Leadbox.....
5 Metal Handle for needle, pen or pencil parts of small compasses...
6 Metal Handle for parts of large compasses.....
7 Center Tack.....

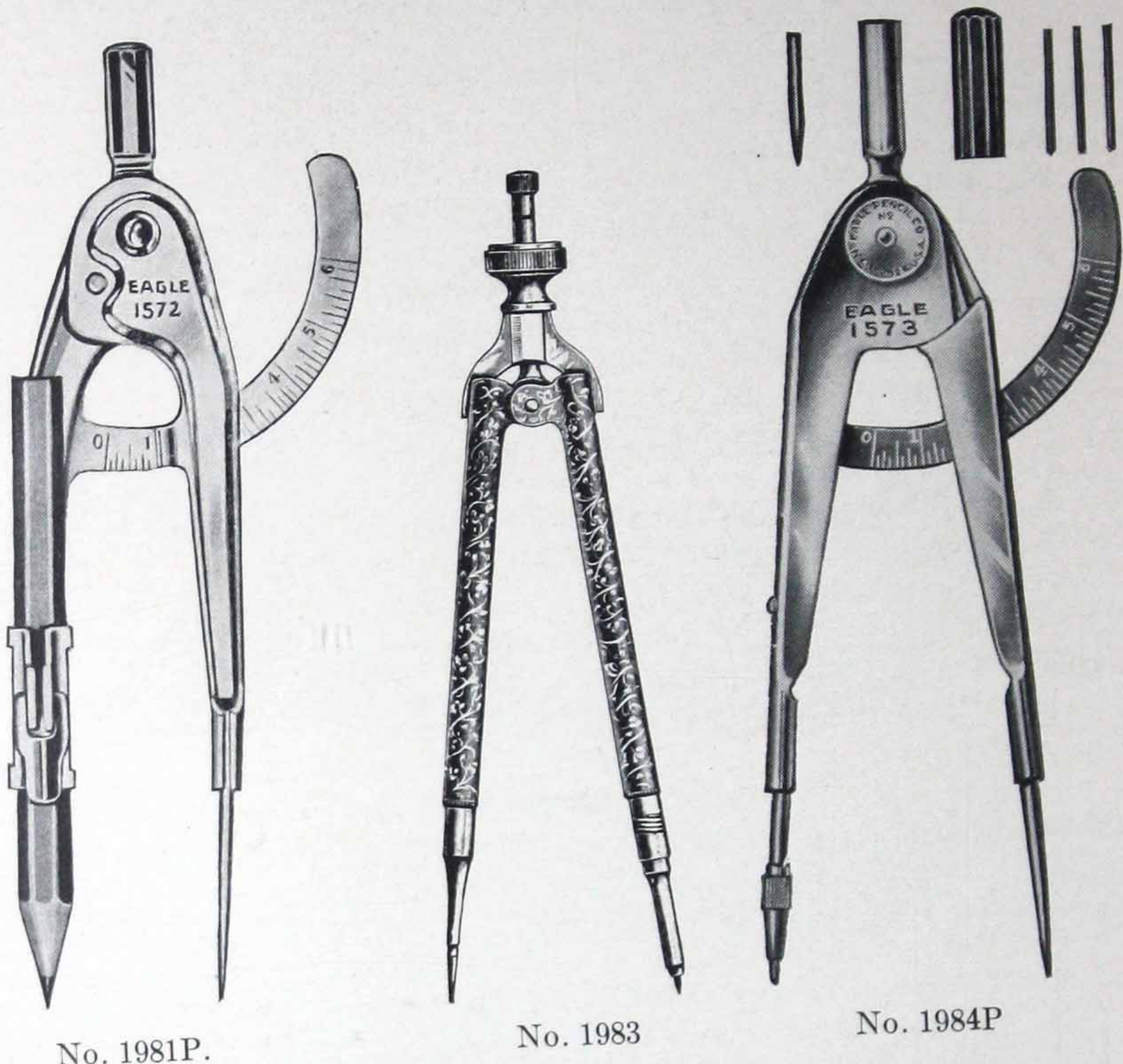
No. 1985V. Tin Box containing 3 leads for instruments.....

When ordering please be sure to specify for which instrument part is wanted.

For Needle Points, Horn Centers, etc., see bottom of page 223.

SEE PRICE LIST IN BACK OF CATALOG

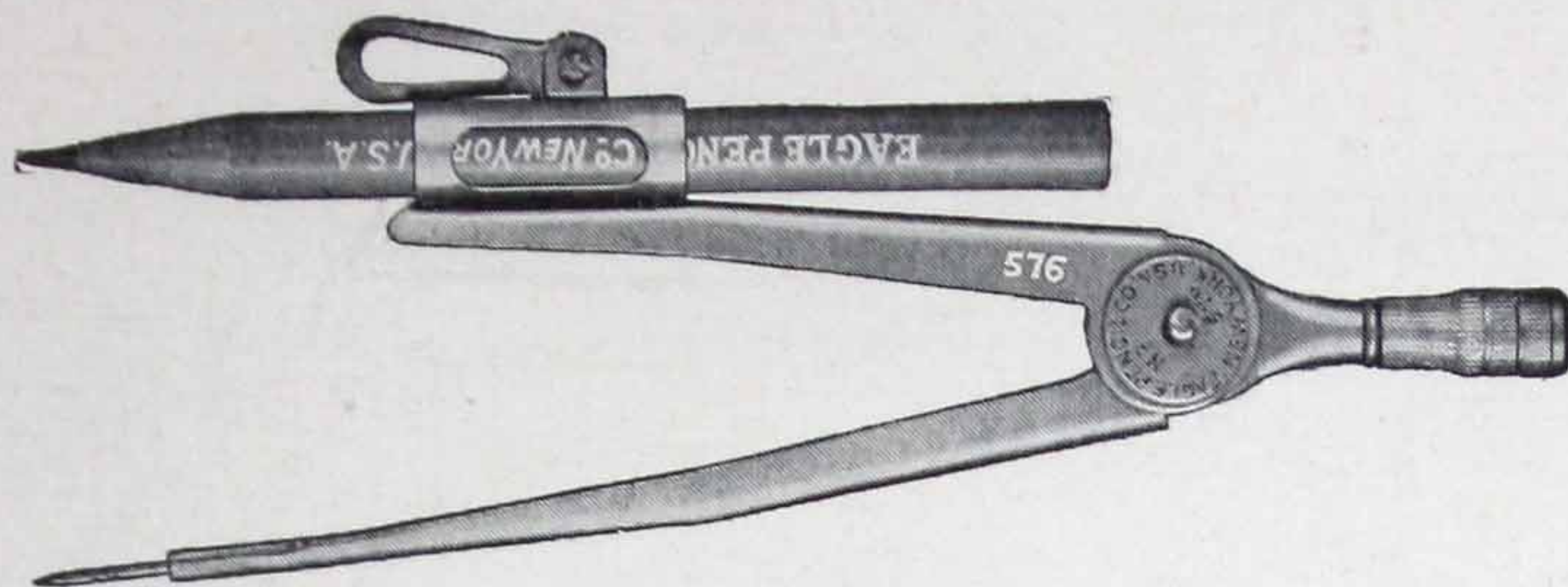
MISCELLANEOUS DRAWING COMPASSES



- | | | |
|-------------------|--|----------------|
| | | Code Word |
| No. 1981P. | Compasses with graduated measuring arc. New positive pencil grip, complete with pencil. Packed 1 dozen in a box..... | RAMPOST |
| No. 1983. | Compasses and dividers with detachable reversible points, for ink and pencil work. Individually boxed.. | RAVEN |
| No. 1984P. | Compasses with graduated measuring arc. Adjustable lead holder. Extra leads and needle points in head of cap..... | REELY |

SEE PRICE LIST IN BACK OF CATALOG

MISCELLANEOUS DRAWING COMPASSES

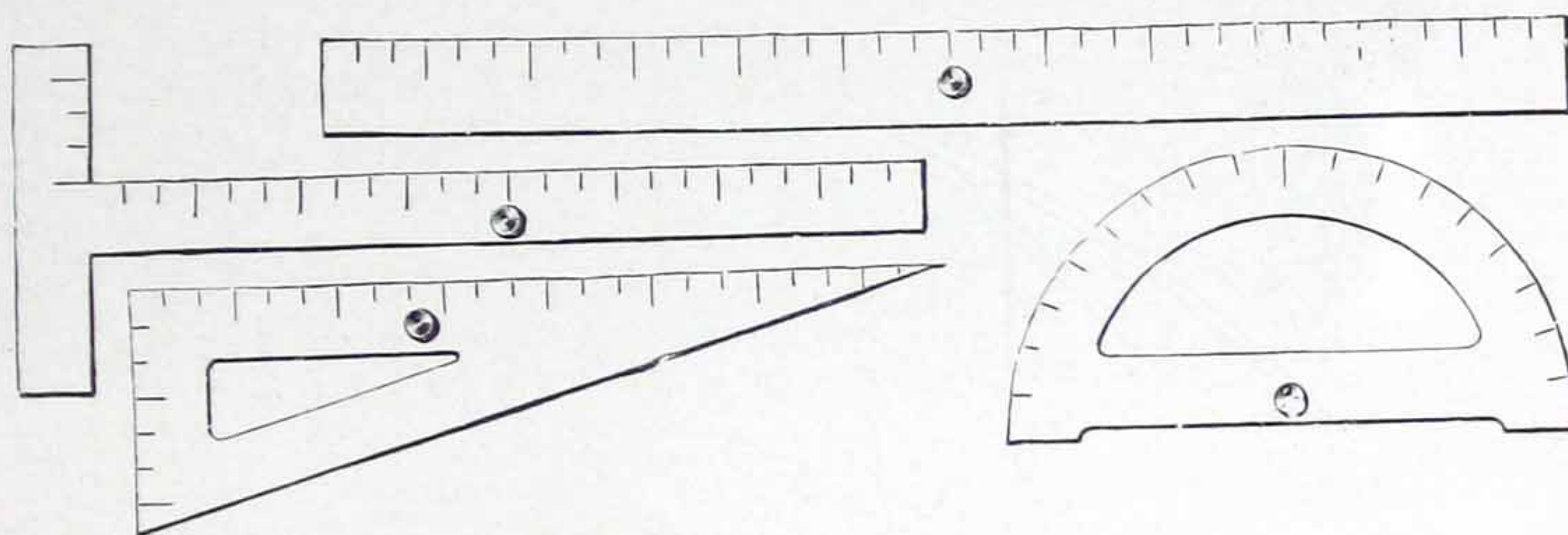


No. 1987

Code Word

- No. 1987.** Compasses with locking type pencil sleeve that holds pencil firmly. Fitted with good quality pencil. Packed 1 dozen in box..... **REBUS**

BLACKBOARD COMPASSES AND SETS



No. 1989N

Used extensively in Mathematics Classes and shop lectures or wherever it is necessary to draw lines, circles or angles for classroom or lecture demonstrations.

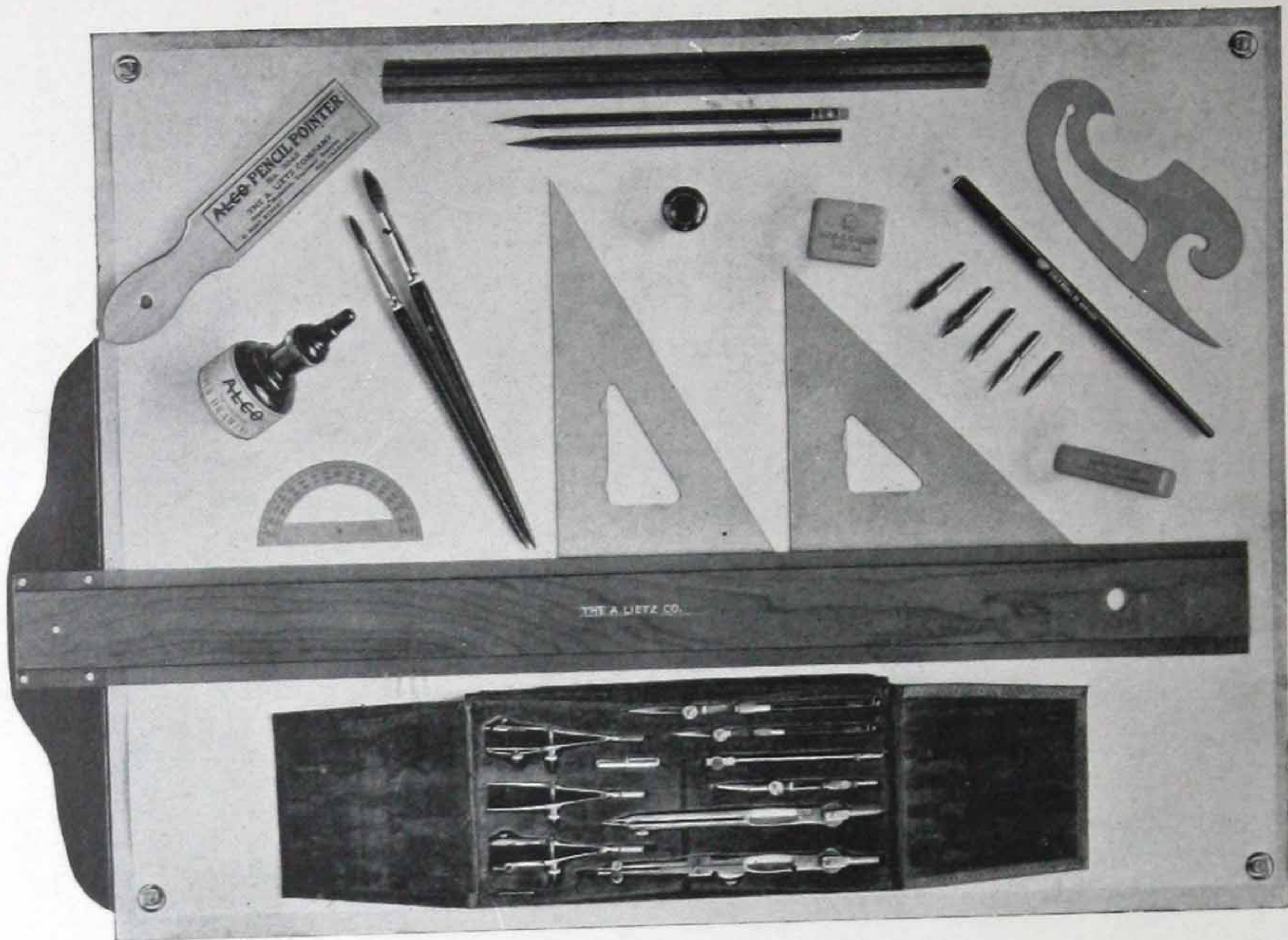
Code Word

- No. 1988B.** Wooden blackboard compasses, 16½ inches long, with reversible steel and rubber points..... **REFER**
- No. 1989N.** Wooden blackboard drawing set consisting of 24 inch T-square, 36 inch straight edge and 24 inch triangle, all graduated to inches and 8ths; and 15 inch protractor divided to degrees..... **REGAL**
- No. 1989A.** 24 in. T-square for above set..... **REGAIN**
- No. 1989B.** 36 in. Straight Edge for above set..... **REGENT**
- No. 1989C.** 24 in. Triangle for above set..... **REGARD**
- No. 1989D.** 15½ in. Protractor for above set..... **REGATE**

SEE PRICE LIST IN BACK OF CATALOG

COMPLETE MECHANICAL DRAWING OUTFITS

Each Outfit Contained in Neat Cardboard Box



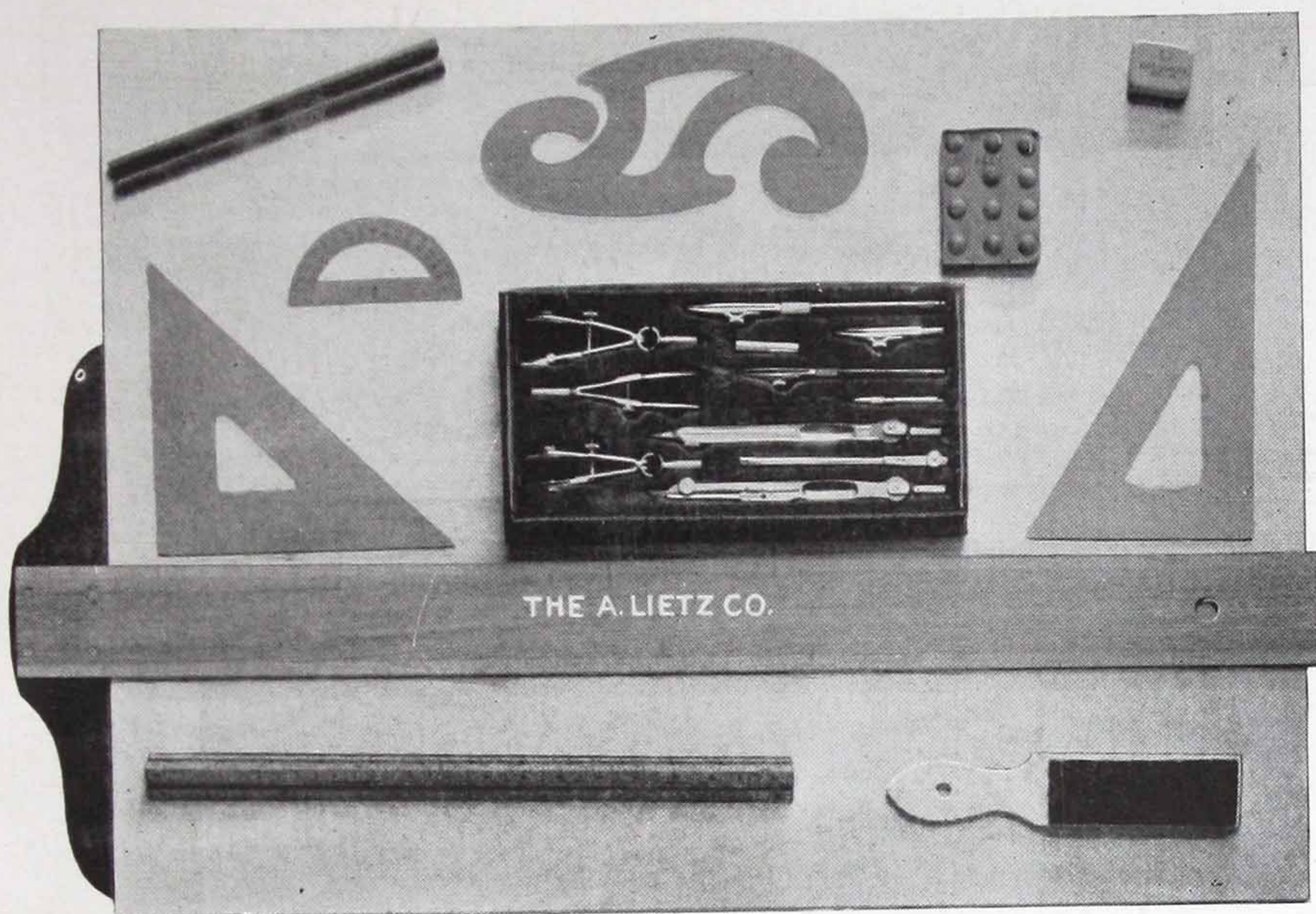
No. 1990

- No. 1990.** Mechanical Drawing Outfit, contains set No. 1955S, Basswood Drawing Board 18x24, Celluloid-lined T-square, 24", Celluloid Triangle 30x60—8", Celluloid Triangle 45-deg.—6", Celluloid Curve, Pencil Pointer, Bottle of Drawing Ink, Brass Protractor, 2 Camel Hair Brushes, 1 Architects' Scale, 2 Drawing Pencils, Ink and Pencil Erasers, Thumb Tacks, Pens and Penholder.....Code Word, **ROCKBIN**
- No. 1991.** Mechanical Drawing Outfit, contains Drawing set No. 1965S, Basswood Drawing Board 18x24, Celluloid-lined T-square 24", Celluloid Triangle 45-deg.—6", Celluloid Triangle 30x60—8", Celluloid Curve, Pencil Pointer, Bottle of Drawing Ink, Brass Protractor, 1 Architects' Scale, 2 Drawing Pencils, Ink and Pencil Erasers, Thumb Tacks, Pens and Penholder.....Code Word, **ROCKBOLT**

SEE PRICE LIST IN BACK OF CATALOG

COMPLETE MECHANICAL DRAWING OUTFITS

Each Outfit Contained in Neat Cardboard Box



No. 1992

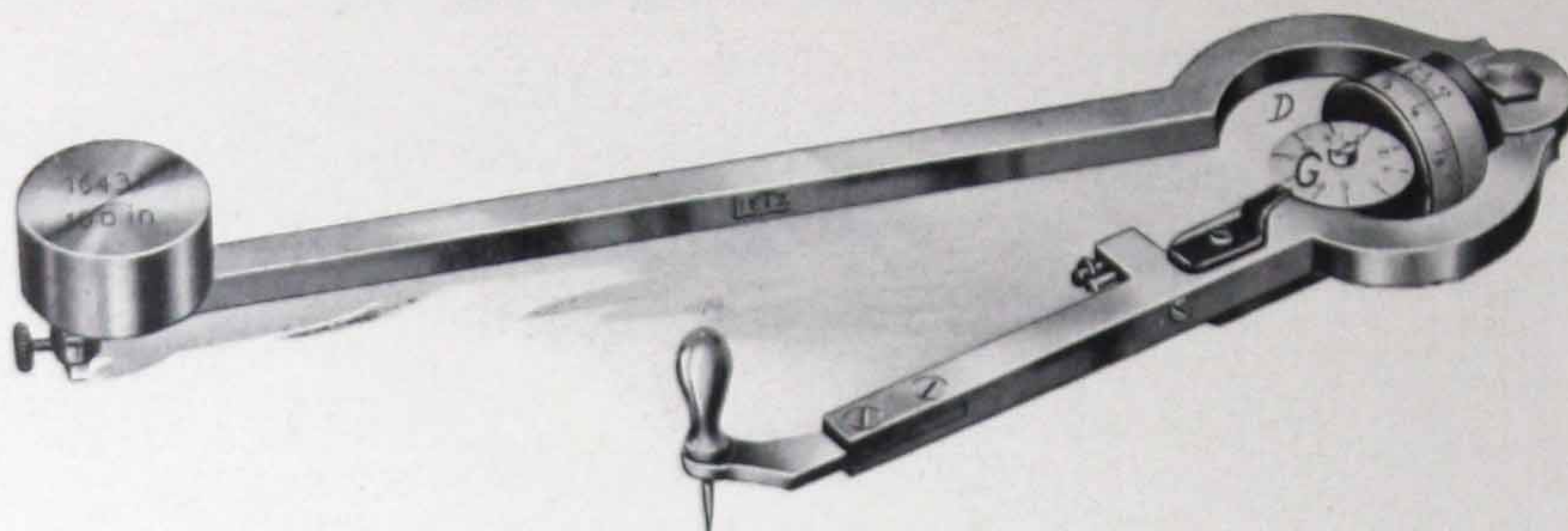
No. 1992. Mechanical Drawing Outfit, contains drawing set No. 1965R, Basswood Board 18x24, Hardwood-lined T-square 24", Celluloid Triangle 30x60—8", Celluloid Triangle 45-deg.—6", Celluloid Curve, Pencil Pointer, Brass Protractor, 1 Architects' Scale, 2 Drawing Pencils, Eraser and Thumb Tacks.....Code Word, **ROCKFORD**

No. 1993. Mechanical Drawing Outfit, contains drawing set No. 1969R, Hardwood T-square 24", Celluloid Triangle 30x60—10", Celluloid Triangle 45-deg.—8", Celluloid Curve, Pencil Pointer, 1 Architects' Scale, 2 Drawing Pencils, Eraser, and Thumb Tacks.Code Word, **ROCKGUN**

No. 1994. Mechanical Drawing Outfit, contains drawing set No. 1961R, Drawing Kit 17x22, with T-square, and Wooden Triangles, Pencil Pointer, 1 Architects' Scale, 2 Drawing Pencils, Eraser and Thumb Tacks.
.....Code Word, **ROCKHILL**

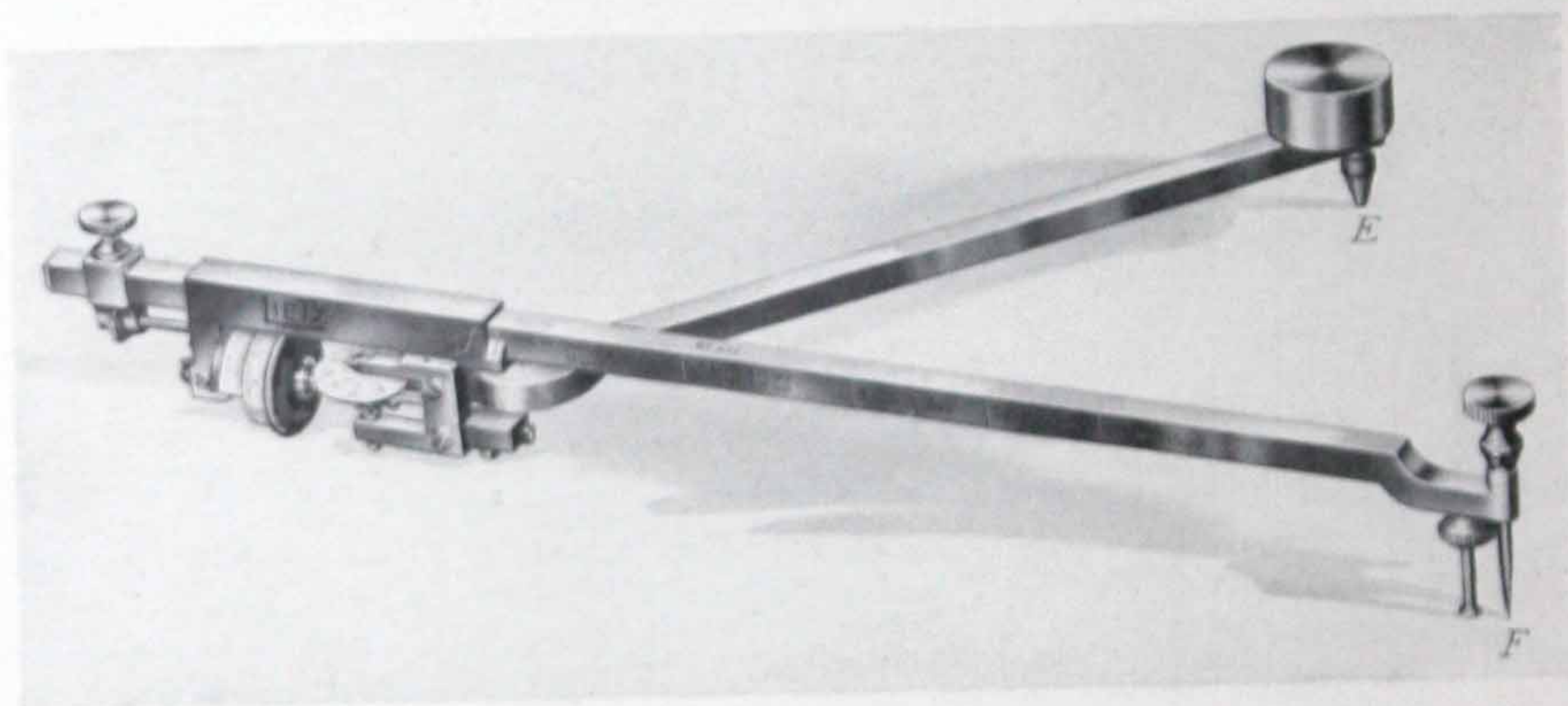
SEE PRICE LIST IN BACK OF CATALOG

POLAR PLANIMETERS



No. 2000

No. 2000. Polar Planimeter, German silver, arranged for measuring areas in square inches. Range: Circle, 18 in. in diameter. In neat velvet-lined case, with instructions. Each.....Code Word, **SABOT**



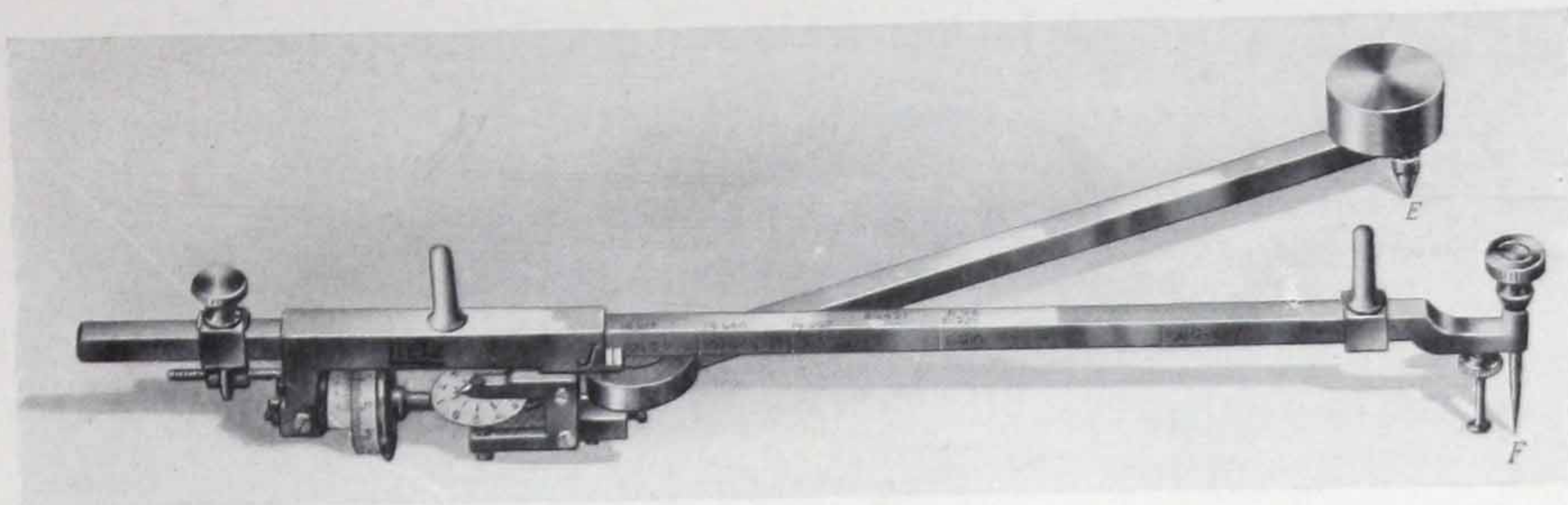
No. 2005

No. 2005. Polar Planimeter, German silver, arranged for measuring areas in several units and scales. Range: Circle 24 in. in diameter. In neat velvet-lined case, with instructions. Each.....Code Word, **SACKBUT**

No. 2006. Polar Planimeter, same as No. 2005, but larger. Range: Circle 42 in. in diameter. In neat velvet-lined case, with instructions. Each.....Code Word, **SACRUM**

SEE PRICE LIST IN BACK OF CATALOG

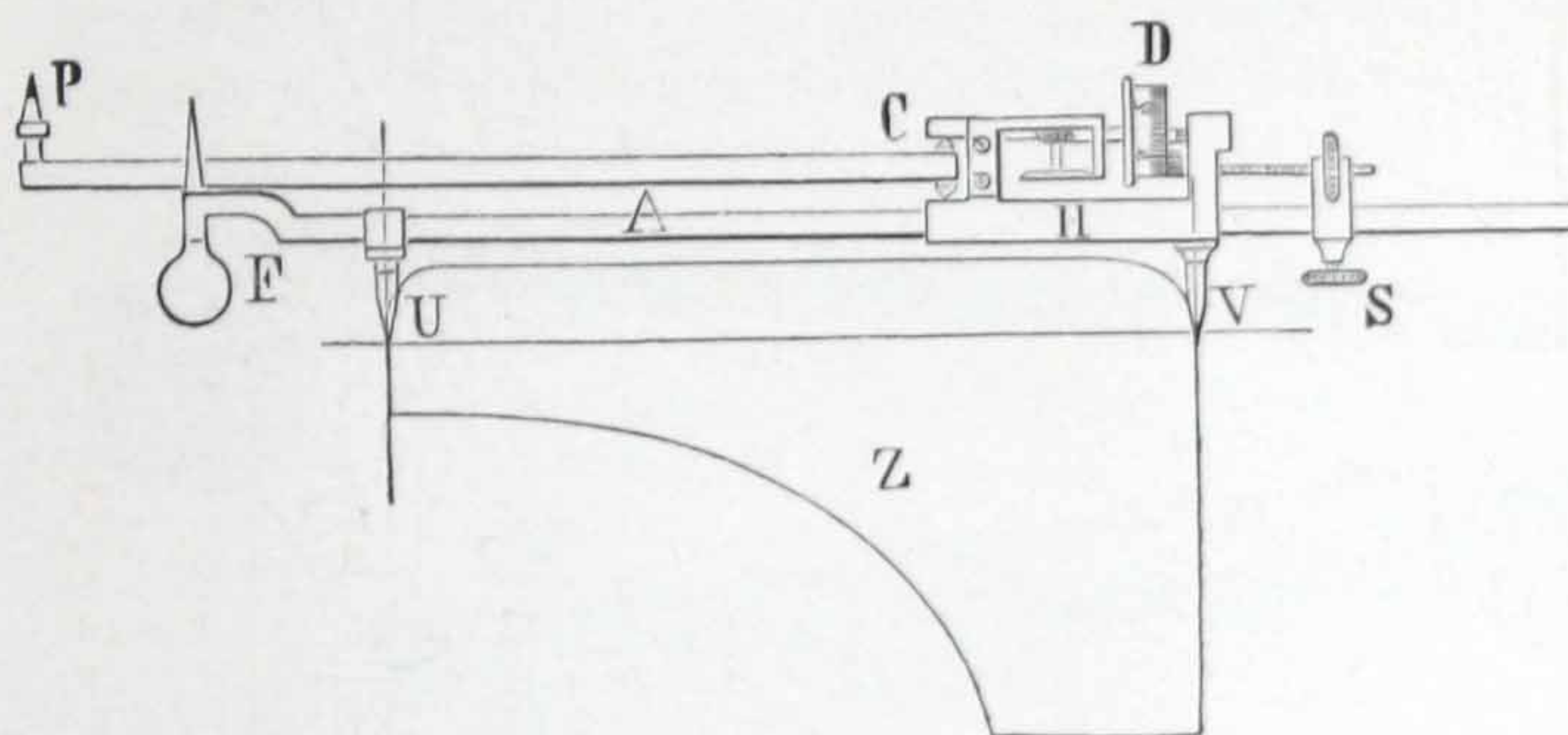
POLAR PLANIMETERS



No. 2010

No. 2010. Polar Planimeter, similar to No. 2005, but with special arrangement for rapidly finding the mean height of indicator diagrams (see explanation below). Range: Circle 25 in. in diameter; length of diagrams 2.8 in. In neat velvet-lined case, with instructions. Each.....Code Word, **SAFFRON**

Arrangement for Finding the Mean Height of Indicator Diagrams



This arrangement consists of two steel points (protected by metal caps when not in use) as shown in the adjoining illustration one attached to the top of the tracer arm, the other to the top of the carriage.

To obtain the mean height of the diagram, hold the instrument upside down, and by shifting the slide on the bar, adjust the two steel points so that they coincide exactly with the length of the diagram. Then place the planimeter without altering the relative position of slide and bar in the usual way upon the drawing—needle point outside the diagram—and follow the outline of the diagram with the tracing point. The difference of the readings at the beginning and at the end of the operation divided by 0.4 will be the mean height of the diagram, expressed in inches.

Example: Second reading 2.361
 first reading — 1.913

0.4) 0.448 = 1.12 ins. = mean height.

If the diagrams for up and down stroke are measured jointly, divide by 0.8 instead of 0.4.

Mean pressure = Mean height \times Scale of spring of indicator. Supposing the scale of the spring in the above example is 1" = 80 lbs. per sq. in., then

$$\text{Mean pressure} = \frac{0.448 \times 80}{0.4} = 89.6 \text{ lbs. per sq. in.}$$

The number of pounds per inch of height being usually a multiple of 4, the arithmetical work is thus extremely simple.

SEE PRICE LIST IN BACK OF CATALOG

COMPENSATING POLAR PLANIMETERS

On these instruments the tracer arm is graduated, and settings can very accurately be made for any scale, either U. S. standard or foreign measurement, and allowances can be made for any shrinkage of the paper. The tracer arm also bears proportion marks for a number of scales for inches and metric measurements.

Compensating Planimeters Nos. 2020, 2021 and 2022 are in two separate parts: one is the tracer arm with measuring and recording wheels, the other the polar arm, having the pole weight at one end and a steel ball at the other, which forms a ball joint with the carriage. The ball joint cannot become loose or shaky, nor is it liable to be injured when adjusting the tracer arm or during shipment, as each part is stored in the case separately. This construction gives the tracer arm a motion of 180° in either direction, therefore the range of these instruments is much greater than that of the ordinary planimeters.

The pole is so constructed as to combine the advantages of the pole plate and the needle point, as the point need not be pressed into the paper and may be used for setting the roller to zero without touching the measuring roller.

By measuring a diagram with the pole on the right, and then on the left side of the tracer arm, and taking the mean of the readings, all errors of the instrument are compensated.



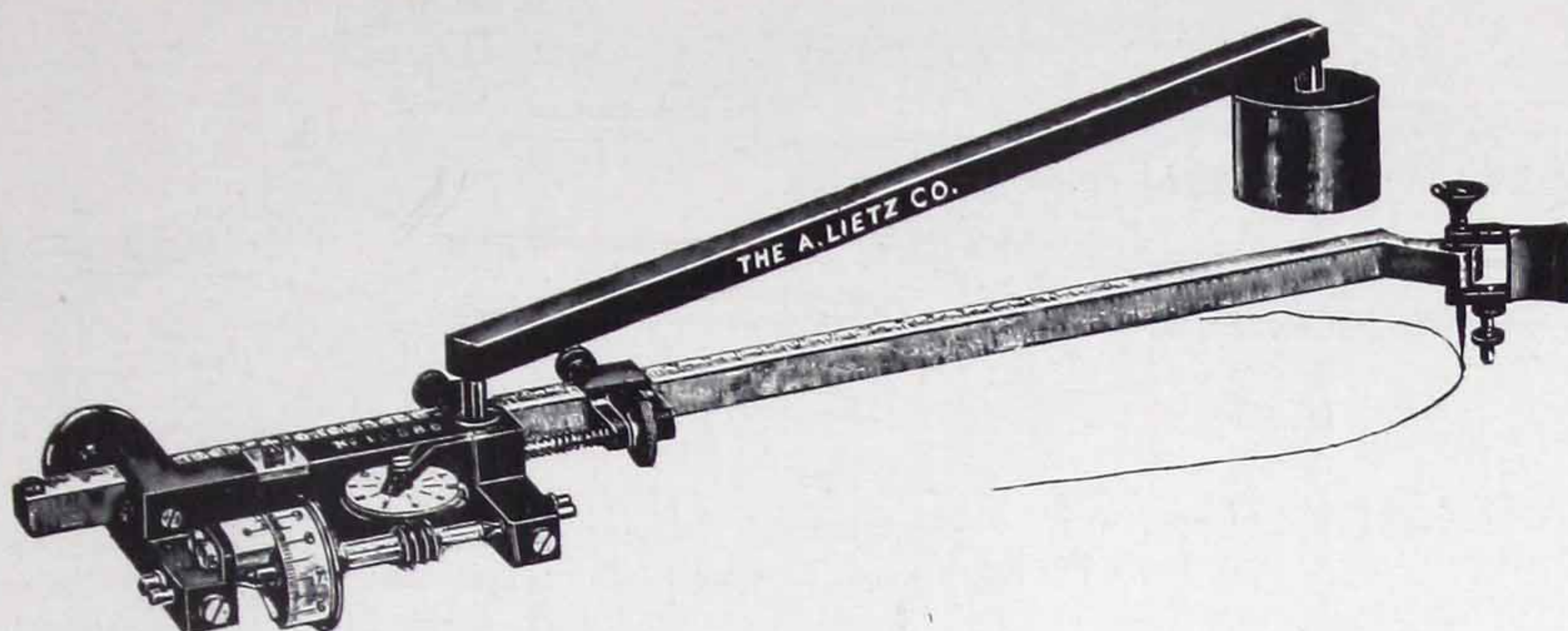
No. 2020

Code Word

No. 2020. Compensating Polar Planimeter, nickel silver and bronze, adjustable tracer arm for vernier unit of .01 sq. in. on a scale of 1:1, pole arm about $7\frac{1}{2}$ inches with improved pole weight. Complete with testing rule, in morocco velvet-lined case, with instructions..... **SAGAS**

SEE PRICE LIST IN BACK OF CATALOG

COMPENSATING POLAR PLANIMETERS



No. 2021

Code Word

No. 2021. Compensating Polar Planimeter, nickel silver and bronze, adjustable tracer arm, fully graduated, fitted with vernier and micrometer for accurate settings, in U. S. Standard or foreign measurements. Allowance can also be made for shrinkage of drawings. Pole arm about $7\frac{1}{2}$ inches with improved pole weight. Complete with table of settings and testing rule, in morocco velvet-lined case, with instructions. **SAGUM**

THE ADJUSTABLE POLE ARM



No. 2022

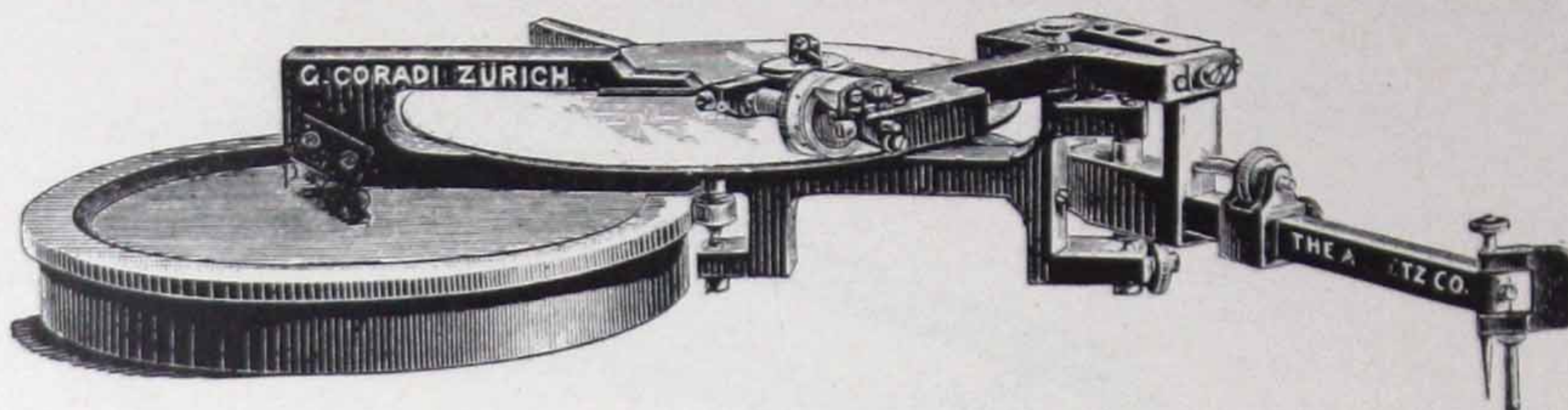
The adjustable pole arm, extending to about 13 inches, bears index marks for the different settings furnished with the instrument, and can be adjusted so that when the instrument is used with the pole inside of a figure, the constant is a round number, 20,000 for any setting. The instrument is used in the same way with the pole inside as with the pole outside, and by tracing the figure with the pole on the right and on the left of the tracer arm (about 13 inches) and taking the mean of the readings, large areas can be measured with great accuracy. The extensibility of the pole arm and the great range of the tracer arm permit of measuring very large figures with the pole outside. By reducing the length of the pole and tracer arms, the instrument can be used in a very small space.

Code Word

No. 2022. Compensating Polar Planimeter like No. 2021, with adjustable pole arm, table of settings and testing rule, in morocco velvet-lined case, with instructions. . . **SAIGA**

SEE PRICE LIST IN BACK OF CATALOG

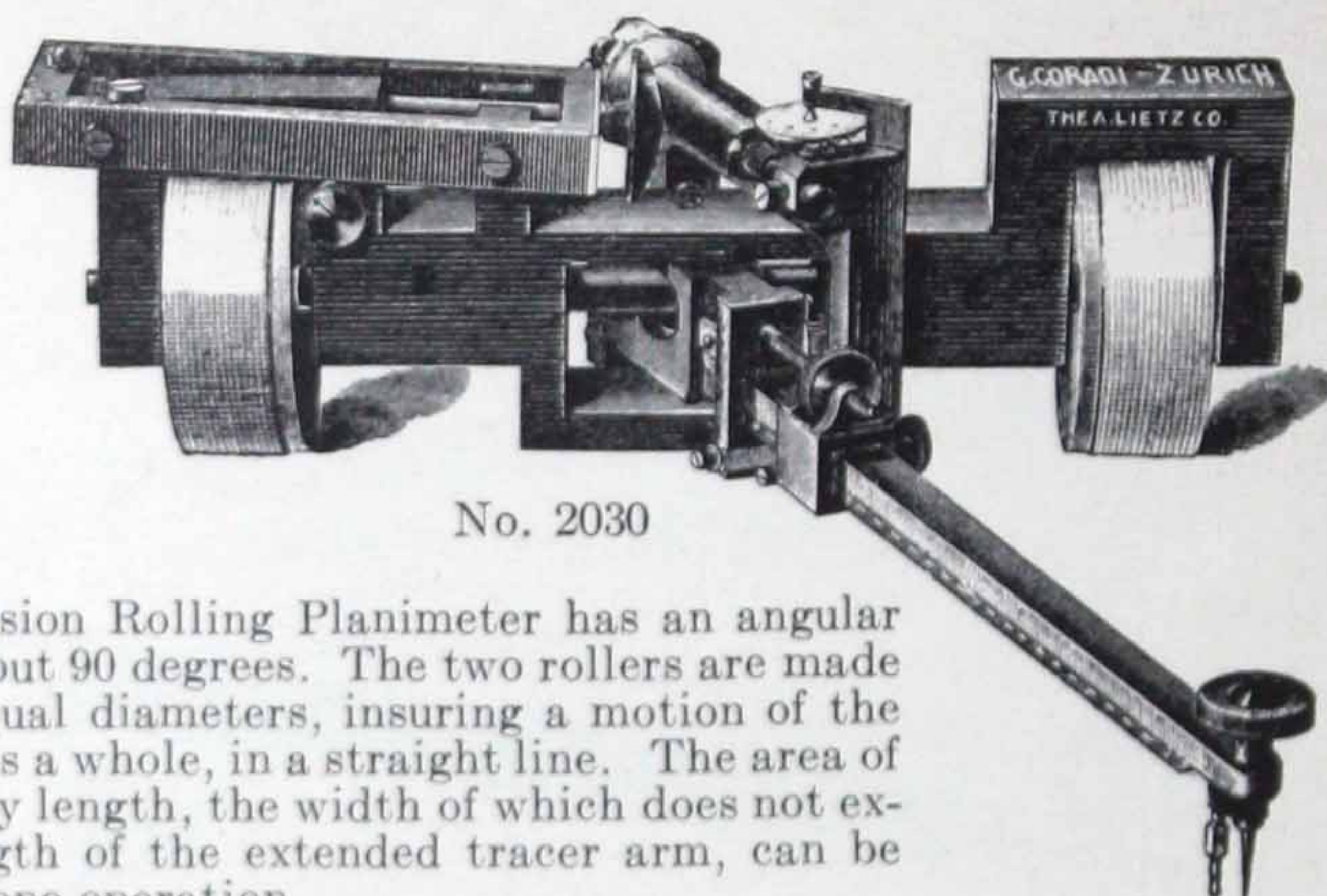
POLAR PLANIMETERS



No. 2029

No. 2029. Polar Disc Planimeter, German silver and bronze, aluminum paper covered disc for measuring wheel, adjustable tracer arm fully divided for settings in any scale, with micrometer adjustment, adjustable for vernier unit from .003 sq. in. to .0008 sq. in. In morocco velvet-lined case, with testing rule and instructions. Each.....Code Word, **SALPINX**

ROLLING PLANIMETERS



No. 2030

The Precision Rolling Planimeter has an angular motion of about 90 degrees. The two rollers are made of exactly equal diameters, insuring a motion of the instrument, as a whole, in a straight line. The area of a figure of any length, the width of which does not exceed the length of the extended tracer arm, can be measured in one operation.

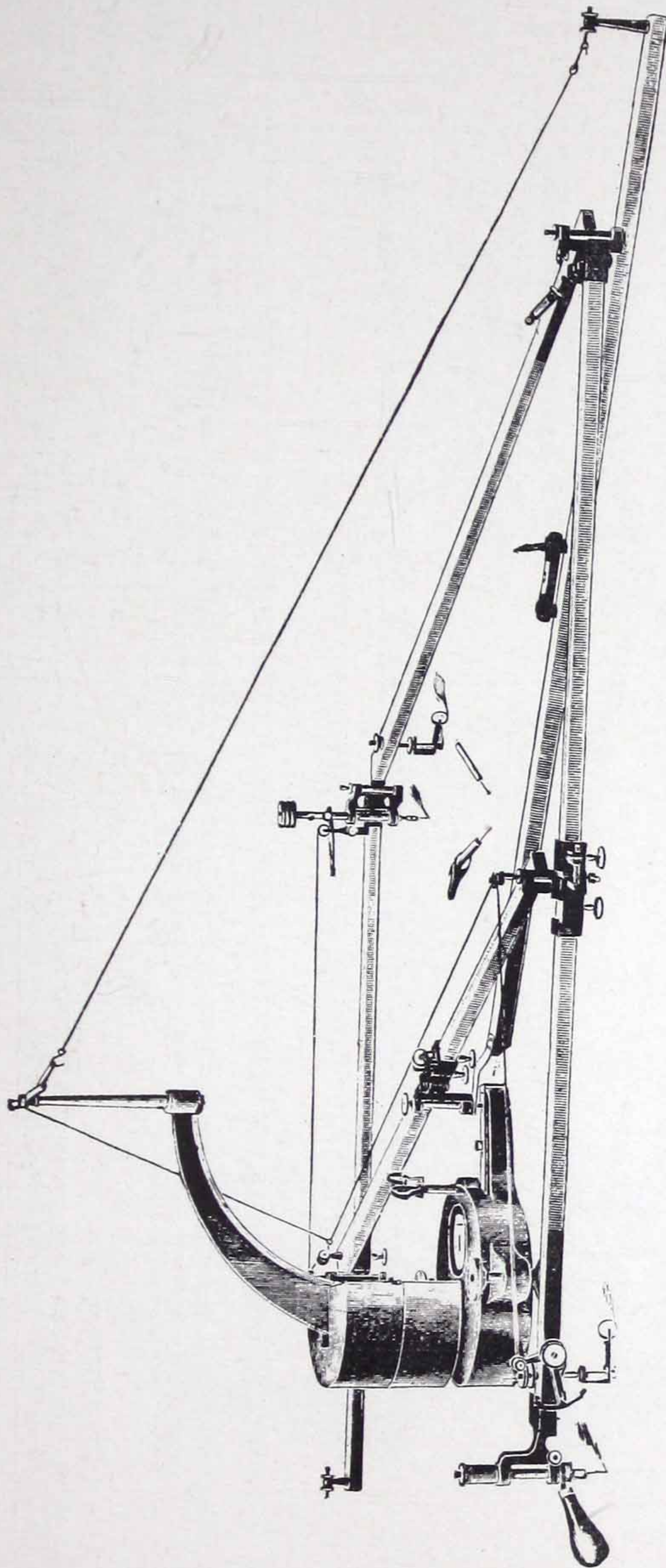
No. 2030. Precision Rolling Planimeter, German silver and bronze, adjustable tracer arm 10 inches long, fully graduated, with 8-in. telescoping extensions. In morocco velvet-lined case, with testing rule, instructions. Each.....Code Word, **SALTANT**

ROLLING DISC PLANIMETER

No. 2032. Precision Rolling Disc Planimeter, German silver and bronze, adjustable tracer arm full graduated, 12 inches long, telescoping extension 10 inches long with micrometer adjustment, adjustable for values of the vernier unit from 0.0032 square inch to 0.0005 square inch. Distance between rollers of carriage is $6\frac{3}{4}$ inches. Disc of aluminum is paper covered and mounted on a vertical axis which can easily be turned between two pivots. The maximum area measured in one operation is a rectangle of any desired length, but width not exceeding the length of the extended tracer arm. Testing rule and table of settings, in morocco case.Code Word, **SALTO**

SEE PRICE LIST IN BACK OF CATALOG

PRECISION PANTOGRAPHS



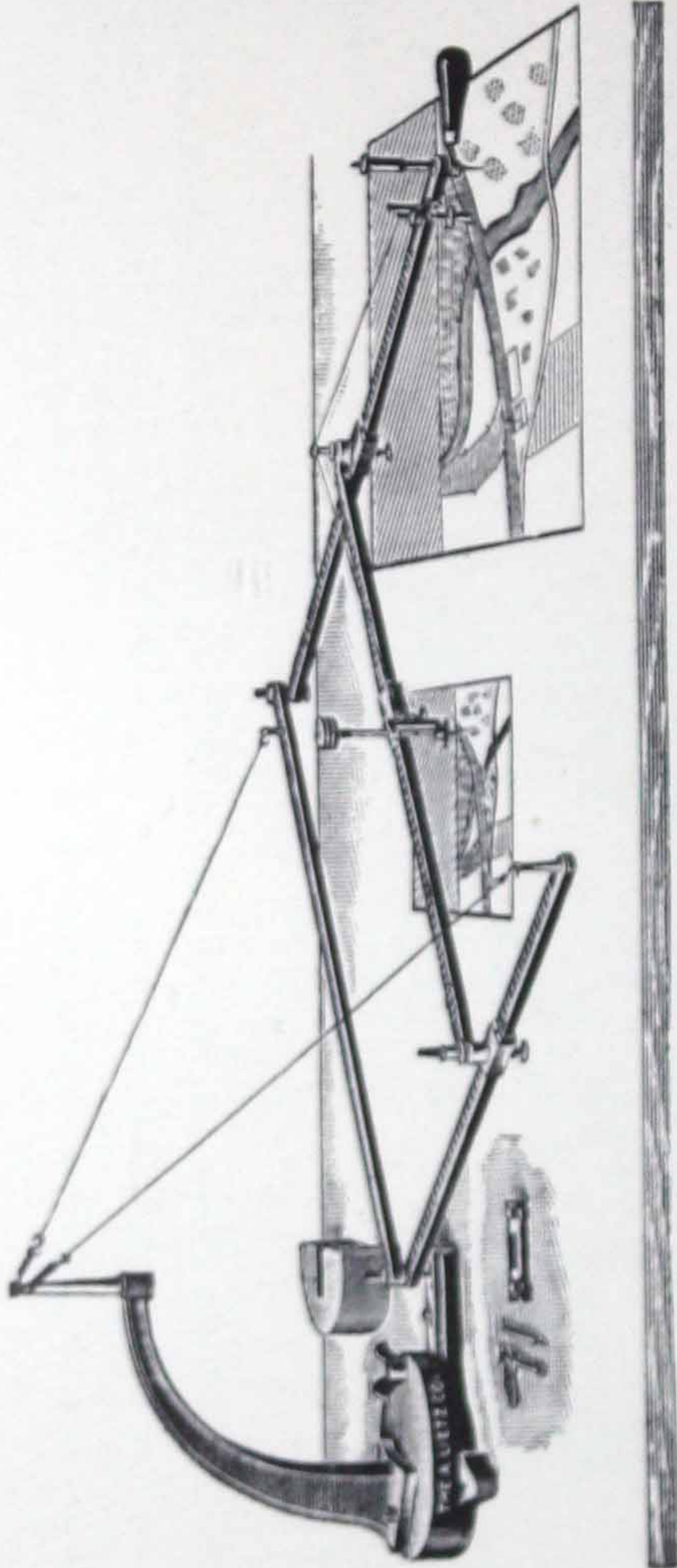
No. 2076

FOR ENLARGING FROM 1:1 TO 1:20 AND REDUCING FROM 20:1 TO 1:1, IN ALL RATIOS

No. 2076. Suspended Precision Pantograph, square metal bars 38 in. long, graduated throughout, with vernier and micrometer adjustments, extra supporting bar and appliances for setting up instruments with the pole within the parallelogram, for reproducing in the size of the original. Instrument complete with all usual accessories; in polished box with lock and key. Each.....Code Word, **SANDSPIT**

SEE PRICE LIST IN BACK OF CATALOG

SUSPENDED PANTOGRAPH



No. 2080

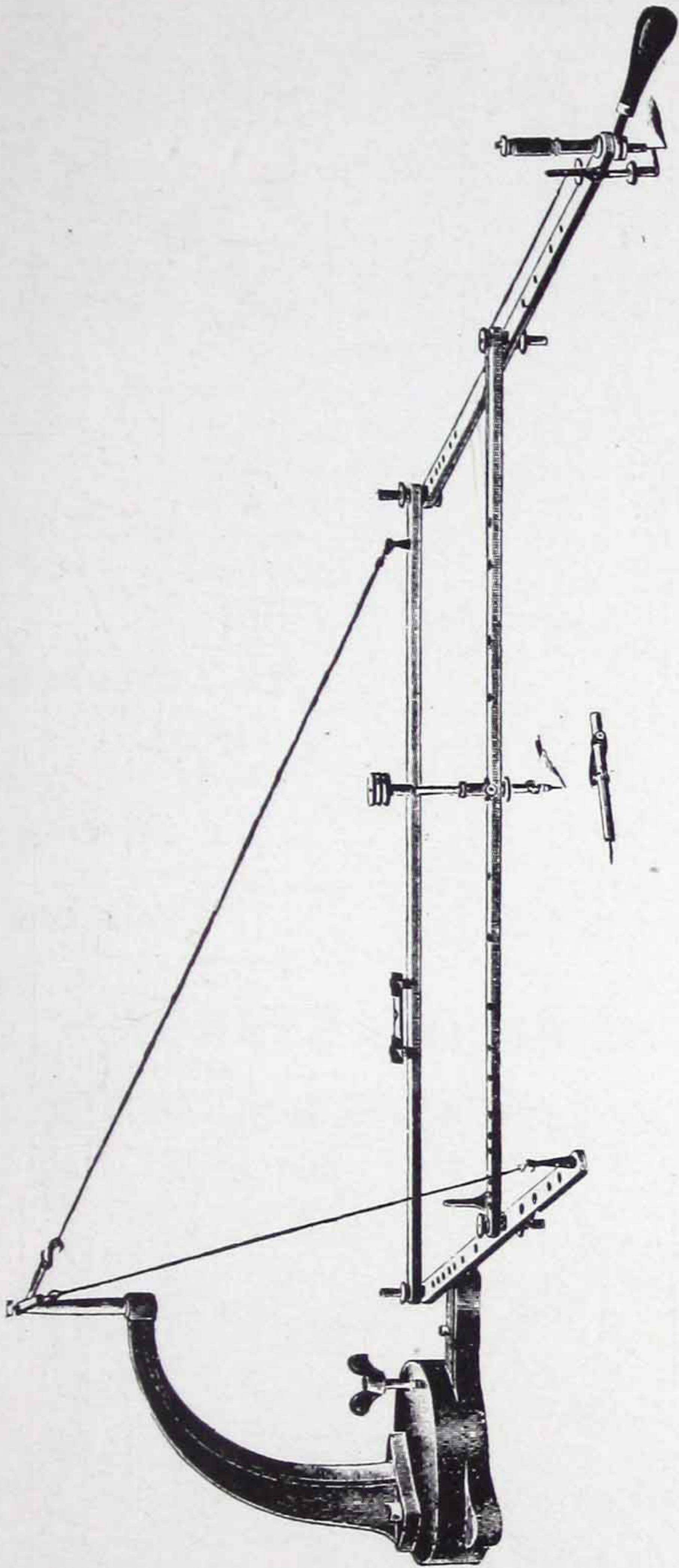
FOR ENLARGING FROM 1:20 TO 4:5 AND REDUCING FROM 20:1 TO 5:4, IN ALL RATIOS

- No. 2080. Suspended Pantograph, square metal bars 28 in. long, graduated throughout, sliding sockets with beveled edges to facilitate the reading of ratios. Instrument complete with all usual accessories, in polished box with lock and key.
Each..... Code Word, **SARCINE**
- No. 2082. Do., but length of bars 38 in..... Code Word, **SARCOMA**
- Pantographs Nos. 2076 to 2082 are furnished with a Tracing Point, a Dotting Needle, a Lead Pencil Slide and a Reverse Dotting Needle; 3 or 4 Brass Weights to weigh down the needle and lead pencil; a small Set Level and Instructions for use. The joints run on cone-shaped steel pivots, to assure an accurate and easy movement.

SEE PRICE LIST IN BACK OF CATALOG

SUSPENDED PANTOGRAPHS

Pearwood Bars



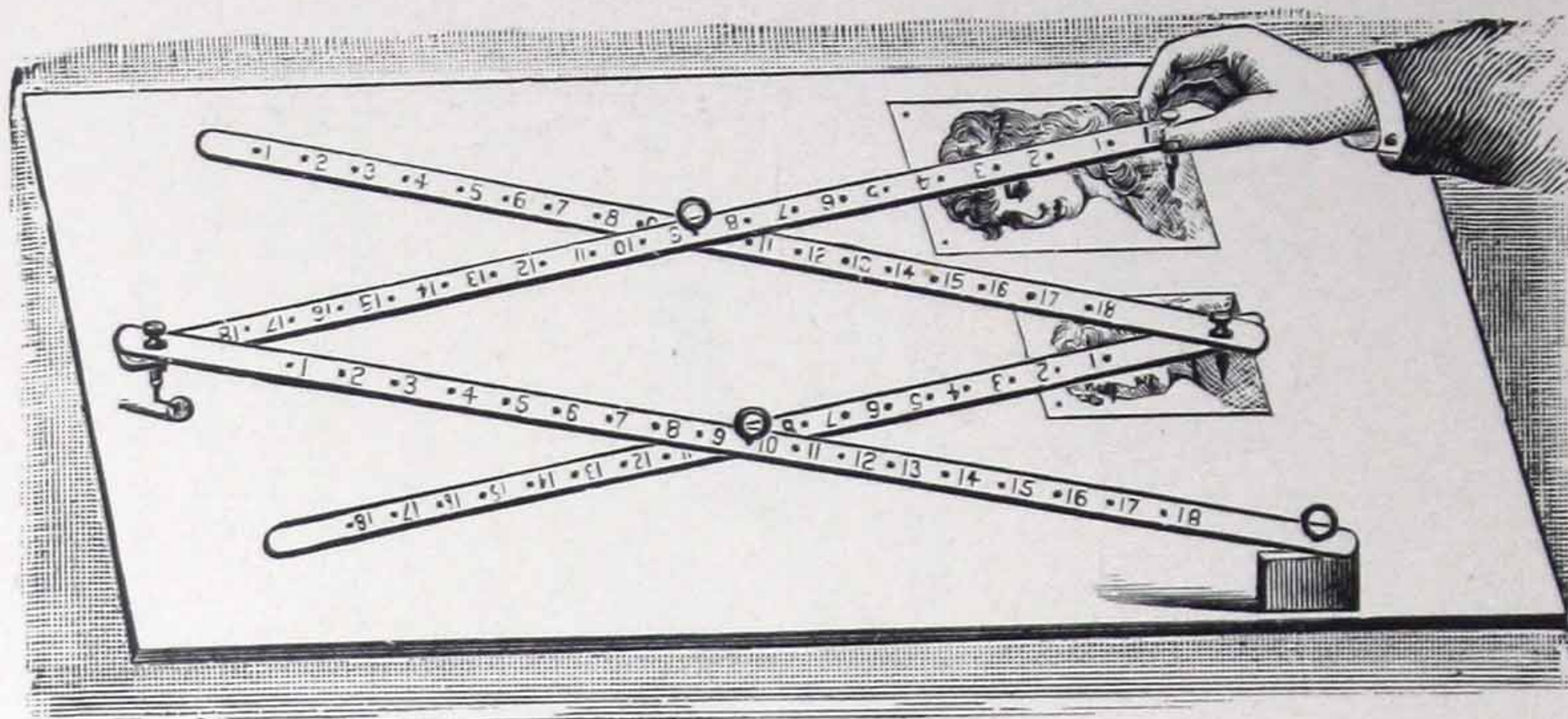
No. 2085

FOR ENLARGING AND REDUCING IN THE FOLLOWING RATIOS:

- No. 2085.** Suspended Pantograph, strong pearwood bars, 28 in. long, made of well seasoned material, with holes accurately spaced for the above ratios. Instrument complete with all usual accessories, in polished box with lock and key. Each..... Code Word, **SATIRIST**
- No. 2087.** Do., but length of bars 38 in..... Code Word, **SATRAP**
- Pantographs Nos. 2085 and 2087 are furnished with a Tracing Point, Steel Point, Pencil Point, 3 Brass Weights to weigh down needle, and Box of Leads. The joints are made of polished steel cones in metal sockets to assure an accurate and easy movement.

SEE PRICE LIST IN BACK OF CATALOG

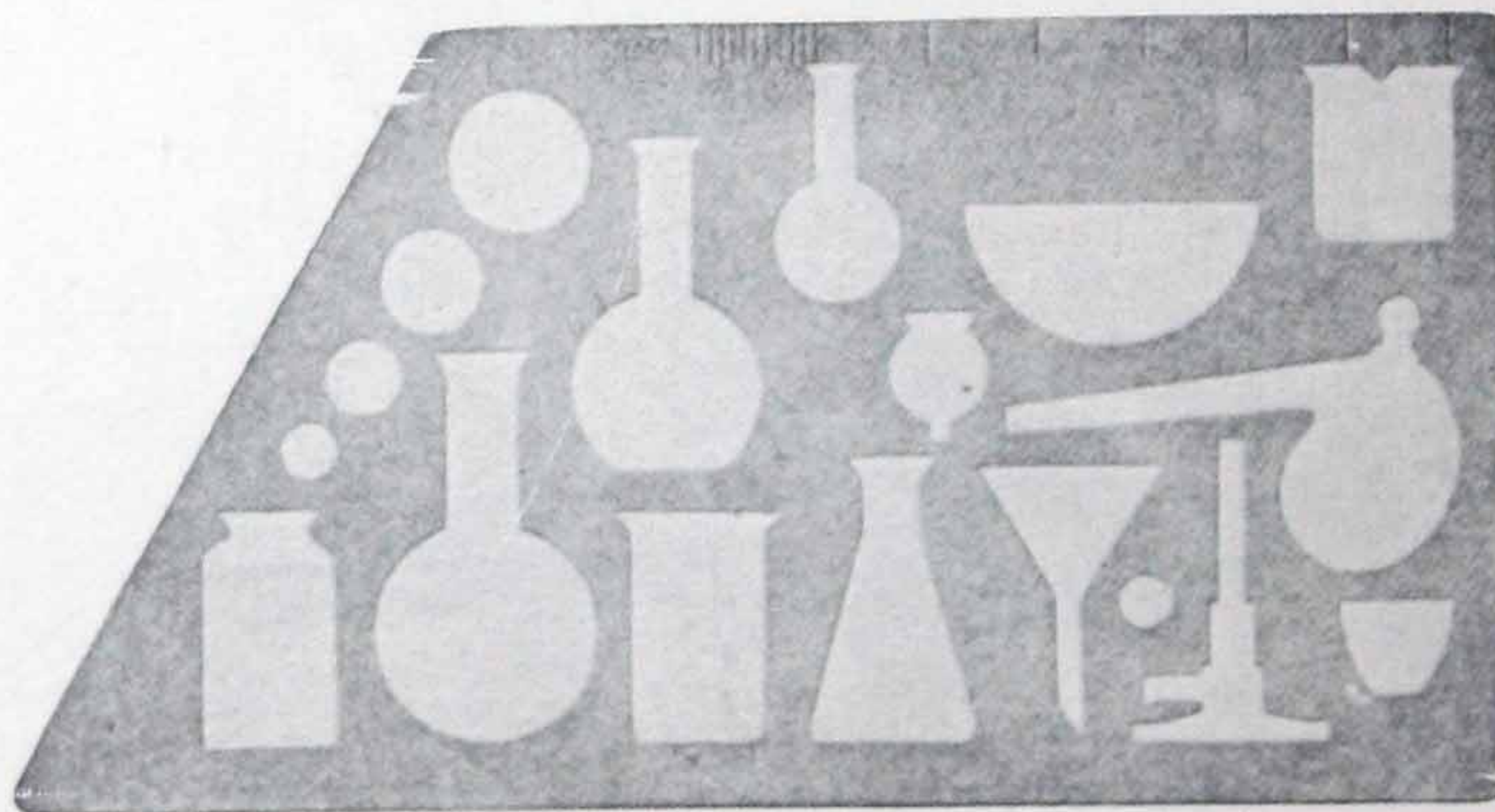
HARDWOOD PANTOGRAPHS



Code Word

- No. 2091. Pantograph of polished inlaid hardwood, bars 41 in. long, for reducing and enlarging drawings from 8:1 to $1\frac{1}{8}$:1 or vice versa, with nickel-plated joints comprised of bolts and thumbnuts, and metal foot; in box with directions. Each.. **SAUTERNE**
- No. 2092. Pantograph of polished inlaid hardwood bars, 21 in. long, for reducing and enlarging drawings from 8:1 to $1\frac{1}{8}$:1 or vice versa, with nickel-plated screw-eye joints and elbow-wheel, in box with directions. Each..... **SATUNER**
- No. 2095. Pantograph polished hardwood bars, 21 in. long, for reducing and enlarging drawings in 49 ratios from size of original. Wooden foot, metal tracer and lead point, metal rest, in box with directions. Each..... **SAURIAN**
- No. 2097. Pantograph hardwood bars 17 in. long, for enlarging 10 ratios from size of original, with directions..... **SAUROID**

CELLULOID CHEMISTRY STENCIL



Code Word

- No. 2100. Celluloid Chemistry Stencils..... **SATURANY**

SEE PRICE LIST IN BACK OF CATALOG

CAMERA LUCIDA

AN INSTRUMENT OF GREAT VALUE TO THE ARTIST, ARCHITECT,
ENGINEER, NEWSPAPER AND ADVERTISING SPECIALISTS
AND STUDENTS



The Camera Lucida is useful for any kind of drawing.

Enlargements (up to 36 times when the rod is at its full length) and reductions can be made from nature or from documents.

The pencil point is clearly seen, and the special cutting of the silvered prism makes it twice as luminous as the old.

The angle of sight is 90° instead of the old 45° . This allows the highest points above the line of horizon to be drawn as well as the ground or first plan.

The reflection on the paper is perfectly steadied by the interposition of the lenses (12 different focuses). These suppress the parallax.

Photographs may be enlarged or reduced, and at the same time corrected, if the vertical lines are converging.

Reversed drawing for **Etchings, Engravings** and **Lithographs** is also a great feature; it does away with the looking glass, and saves much time, as the copy is reversed with the right to the left.

Painters and designers can outline with exactitude the most complicated lines of perspective, scenery, or even a living model can be sketched in a few moments, reducing much work to the illustrator.

Portrait painters are guided to the correct pose, which is a first condition of success.

Architects can rapidly draw a sculpture or enlarge the photograph of a monument, and can copy to a scale the most complicated geometrical drawings without searching.

Industrial designers of fashions, furnishing, jewelry, etc., will save much time by using this camera.

Engineers and surveyors will find it most useful for copying maps, plans, or any document, to any scale.

For amateurs, it provides a charming pastime for in and out of doors, without previous study.



No. 2101C. Camera Lucida with three draw telescopic slide bar, the last with rack and pinion movement, nickel finish; fullest length, 25 inches, and 12 lenses of different focuses; complete in black leather case, lined with velvet and silk; size, $11 \times 2\frac{1}{4} \times 1\frac{1}{4}$...Code Word, **SATURN**

No. 2101D. Camera Lucida with one draw telescopic slide bar in polished brass fullest length 20 inches, and 12 lenses of different focuses; complete in waxed walnut box, green cloth lined, spring clasp; size $11\frac{1}{4} \times 2\frac{1}{2}$,Code Word, **SATYR**

SEE PRICE LIST IN BACK OF CATALOG

THE BRISCHOGRAPH



The Brischograph is an indispensable piece of equipment for every Commercial Artist, Designer and Display Man. Any photo, magazine illustration or sketch, regardless of size can be clearly projected to the desired size in perfectly defined detail and in natural colors with all reading matter from left to right as on the original. The projected picture can then be followed with pen, pencil or brush. The Brischograph is sturdy and compact and simple to operate.

Code Word

- No. 2102A.** Standard Brischograph with two Standard Sockets and two 200-watt Standard Lamps; 10 feet of Asbestos Cord, two 4 inch Lenses with Transpose Mirror on the inside. Covers 7 by 7 inches of picture at one time. A life-size projection within 10 feet from screen.....

SAVACK

- No. 2102B.** Junior Brischograph, one-third size of Standard Brischograph No. 2102A. An exact duplicate in quality of line and construction. Will cover 4 by 4 inches of copy at one time and enlarge to 4 by 4 feet. By removing bottom slide greater coverage and enlargement are possible.....

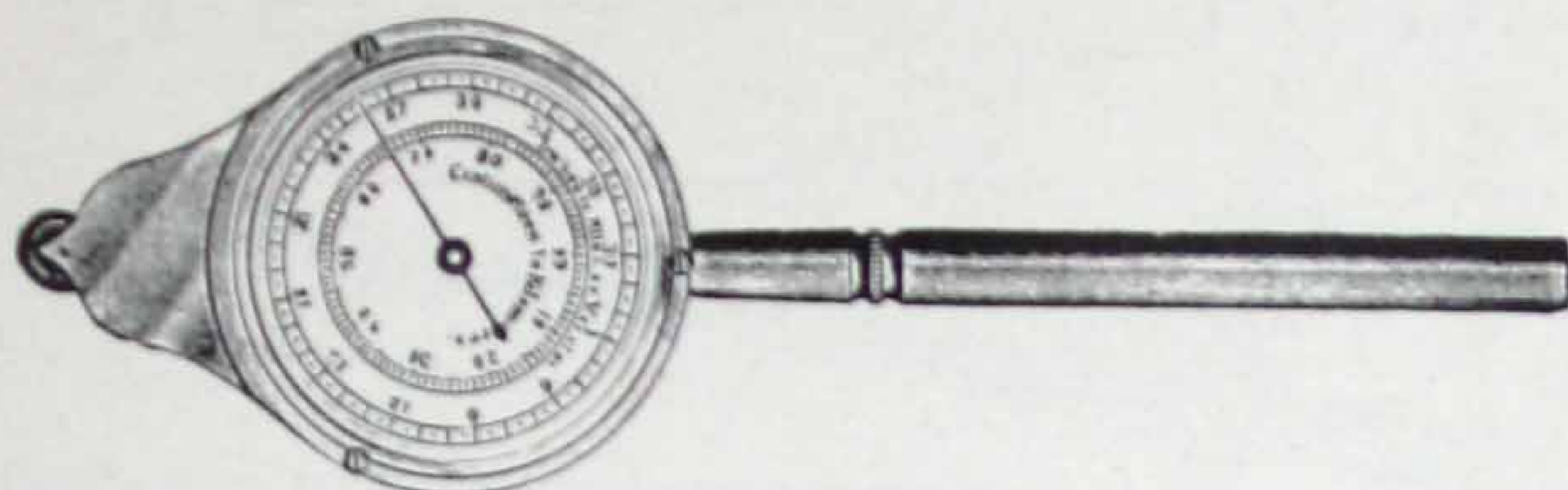
SAVADE



SEE PRICE LIST IN BACK OF CATALOG

MAP MEASURES

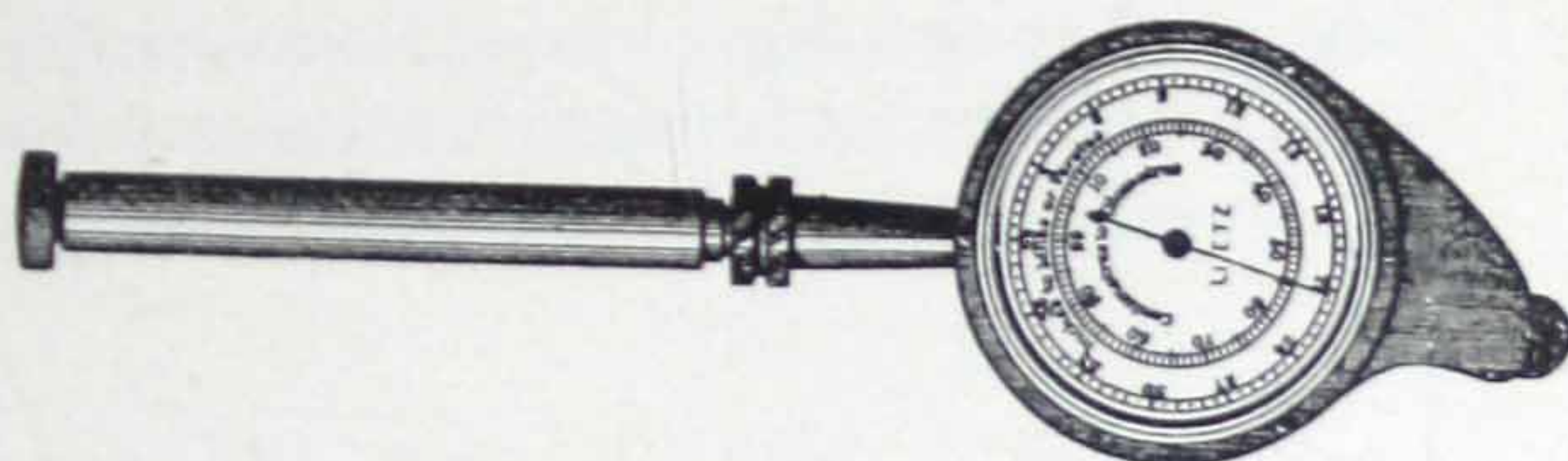
For measuring curved or straight lines.



No. 2103

- No. 2103. Map Measure, $1\frac{1}{4}$ in. dial, fixed metal handle, with two graduations: inches to miles and centimeters to kilometers..... SAVANT

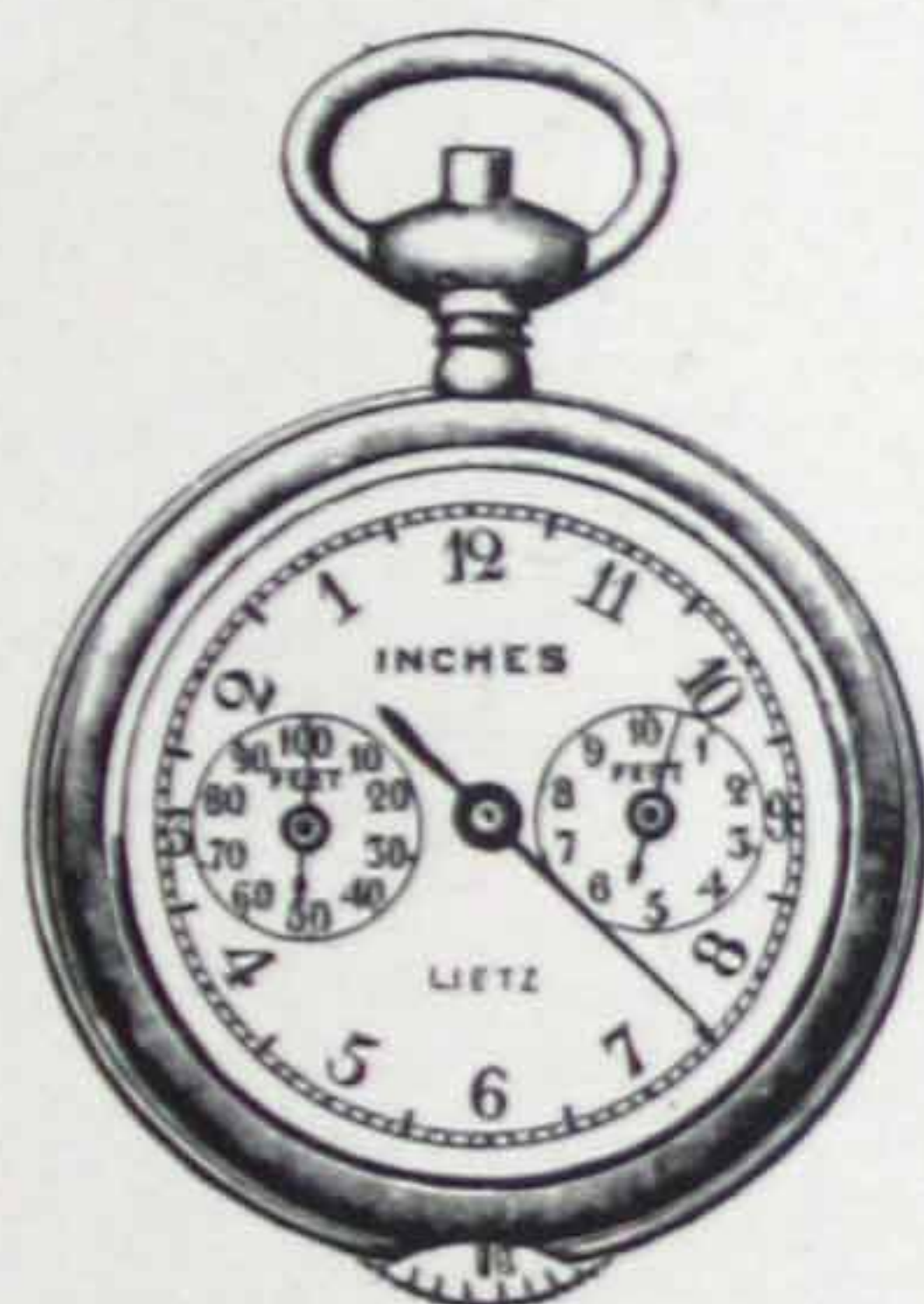
Code Word



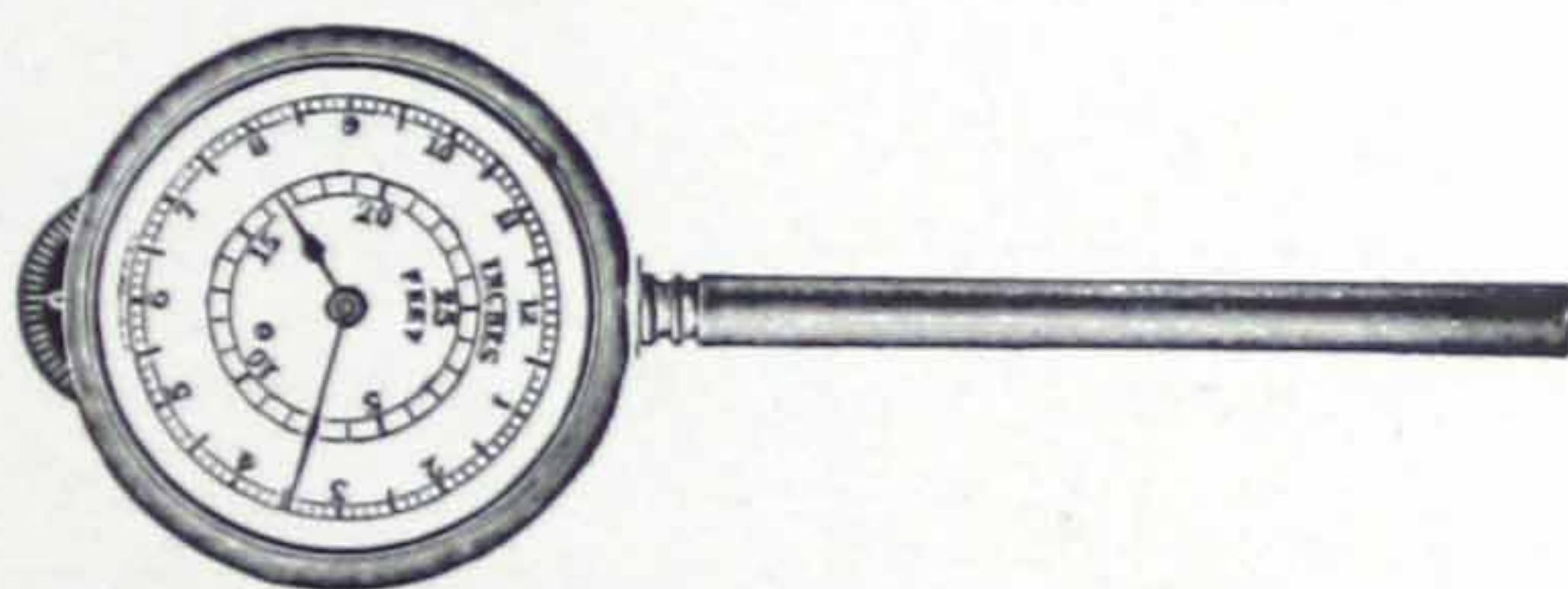
No. 2104

- No. 2104. Map Measure, same as No. 2103, but with swiveling metal handle..... SAVELOY

Code Word



No. 2105



No. 2107

- No. 2105. Map Measure, watch pattern, $1\frac{3}{4}$ in. diameter, three dials, registering 100 feet in feet, inches and eighths, with zero setting device..... SAVIN
- No. 2107. Map Measure, with fixed handle, $1\frac{1}{4}$ in. dial registering 25 feet in single feet, inches and eighths..... SAVOY

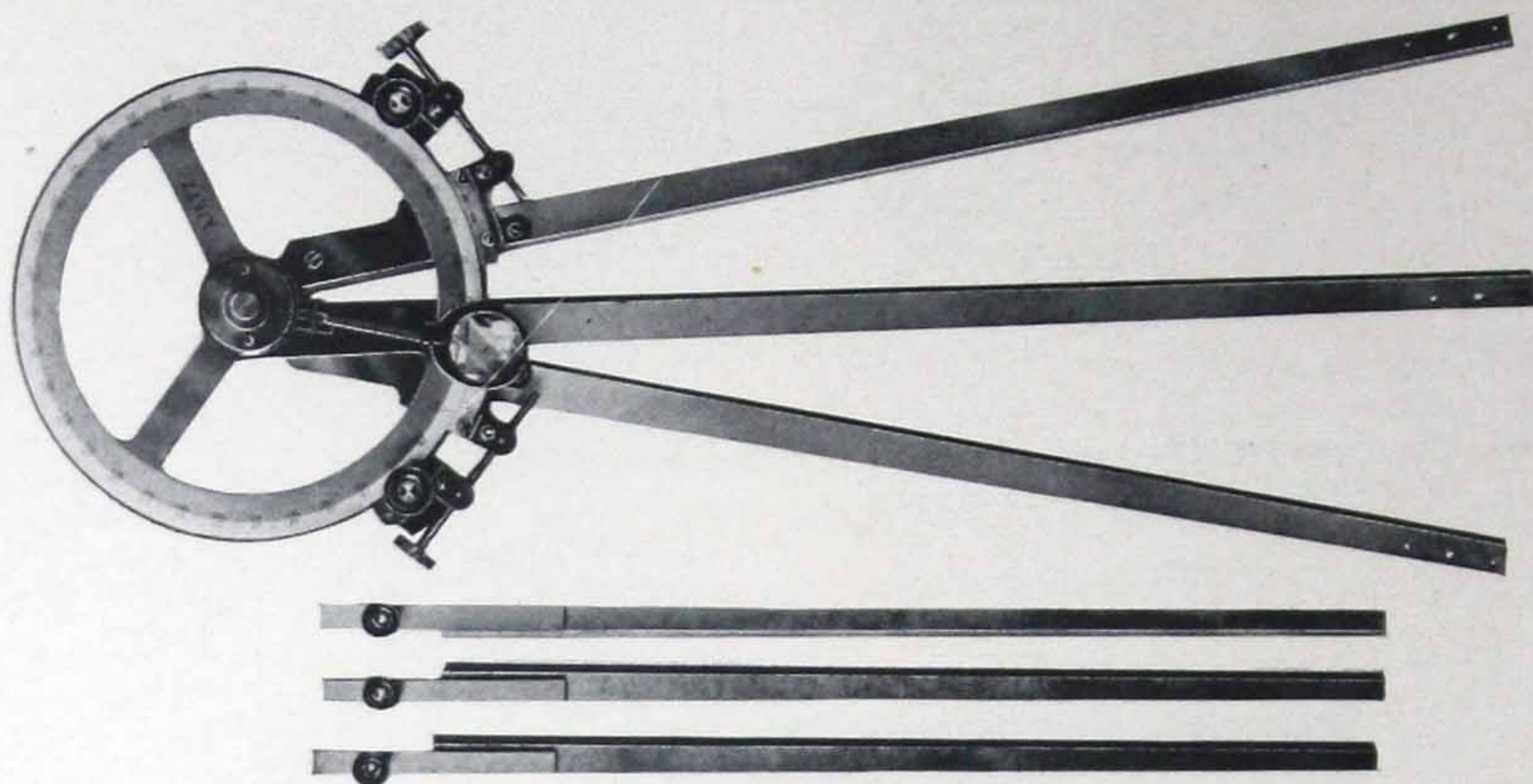
Code Word

To measure a line the instrument should be set to zero. The projecting wheel is then run along the line in one direction, the index hands indicating the length of line in feet, inches and eighths.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ PROTRACTORS

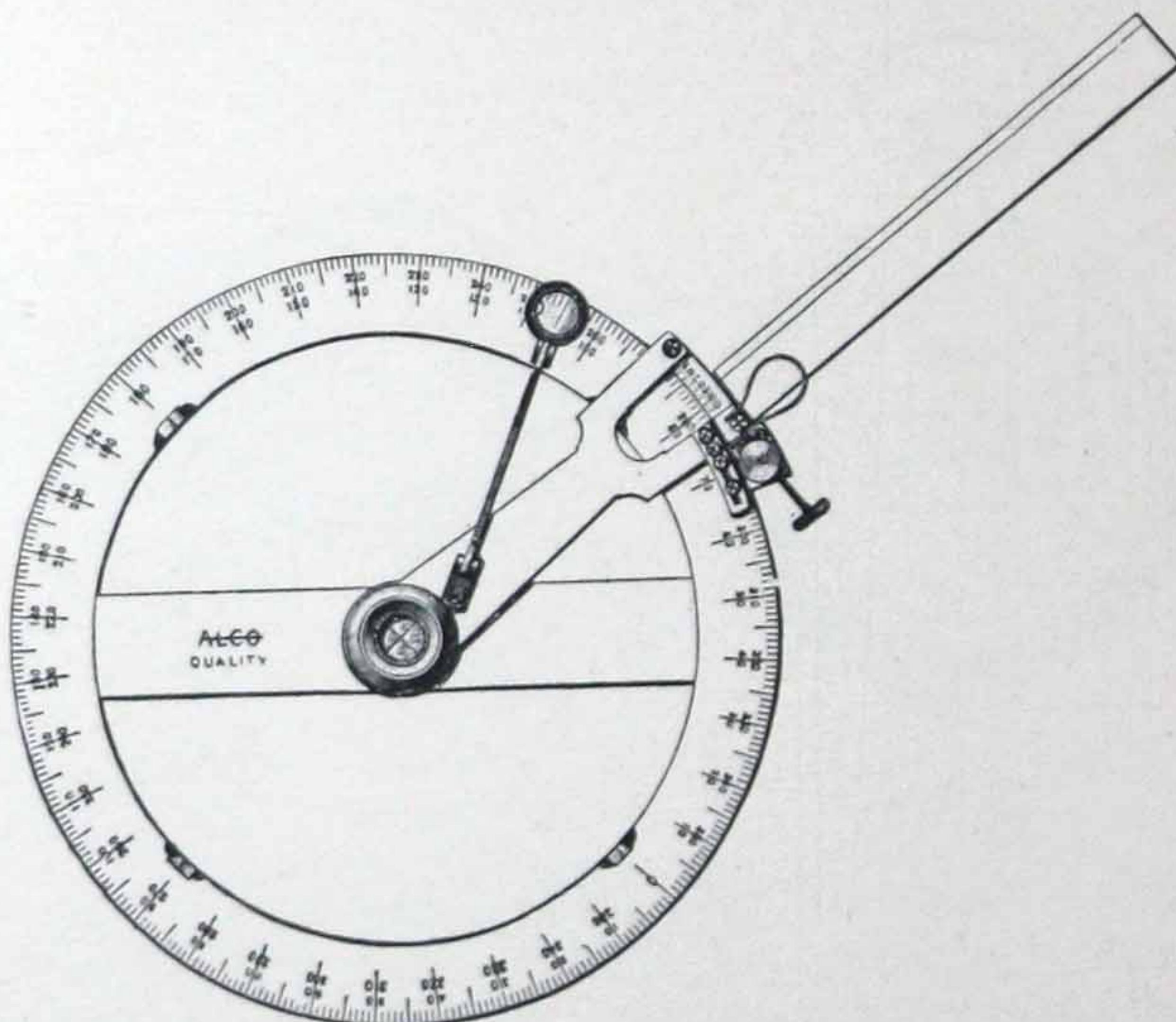
Three-Arm Protractor or Station Pointer
As made by us for the U. S. Navy Department



No. 2110

No. 2110. Three-Arm Protractor or Station Pointer, in polished mahogany box, complete. Code Word, **SCABBY**

Lietz Three-Arm Protractor No. 2110 is divided on solid silver to half degrees and numbered in opposite directions from 0 to 360, with two verniers reading to single minutes. Both verniers with tangent screw. Size of circle $6\frac{1}{2}$ inches. Magnifying glass on swinging arm. Three arms made of German silver, each 17 inches long with extension pieces to lengthen to $27\frac{1}{2}$ inches beyond the edge of the circle.

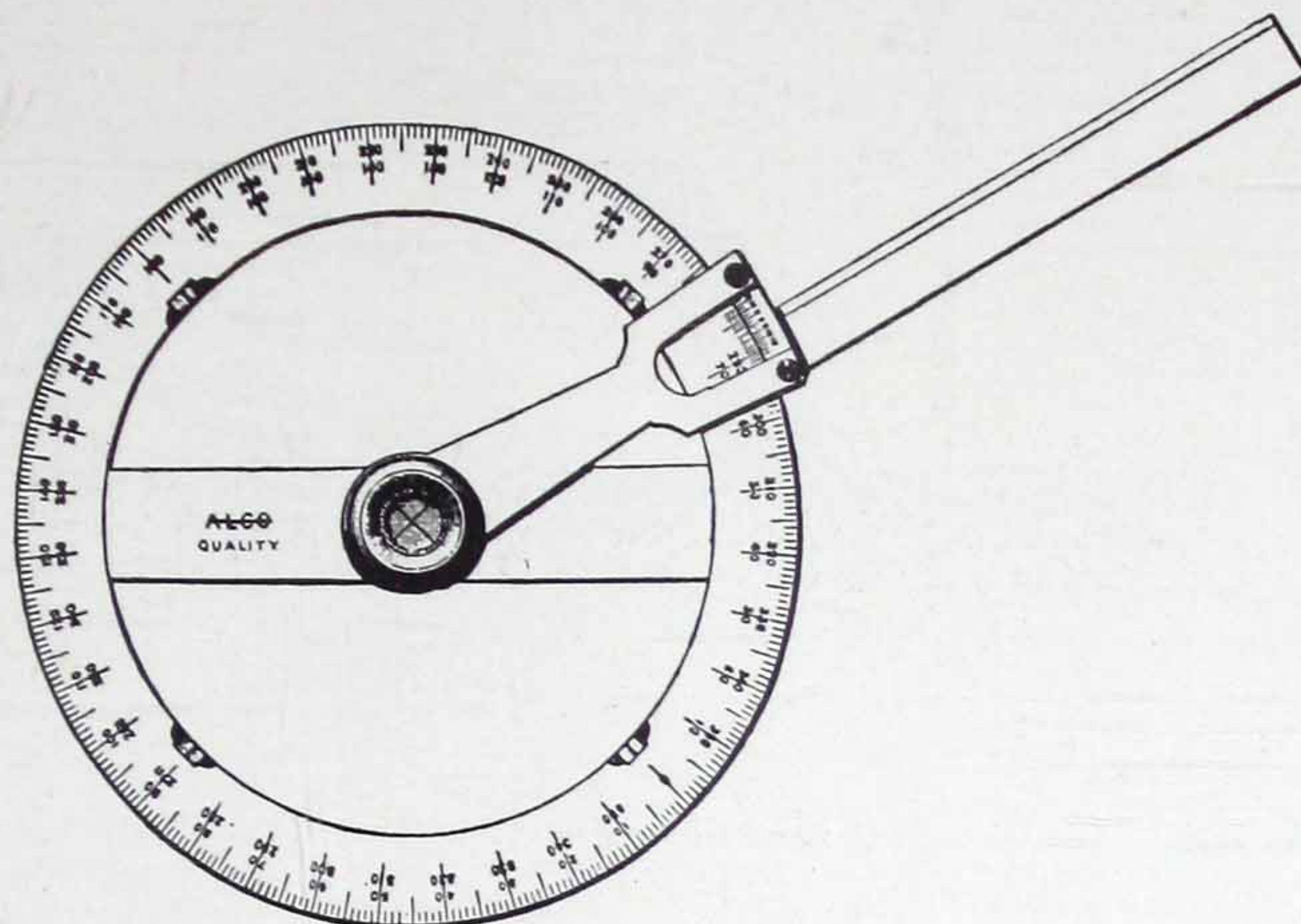


No. 2117

- No. 2117. Circular German silver Protractor, 10 in., divided to $\frac{1}{4}$ degrees, vernier reading to 1 minute. Movable arm $6\frac{1}{2}$ in. long, with clamp screw and micrometer to vernier. Horn Center. Code Word, **SCALENE**
- No. 2118. Attached Reading Glass on swinging arm. Code Word, **SCAMP**
- No. 2117C. Circular German Silver Protractor No. 2117 with Attached Reading Glass No. 2118 in silk velvet lined morocco case. Code Word, **SCALENIC**

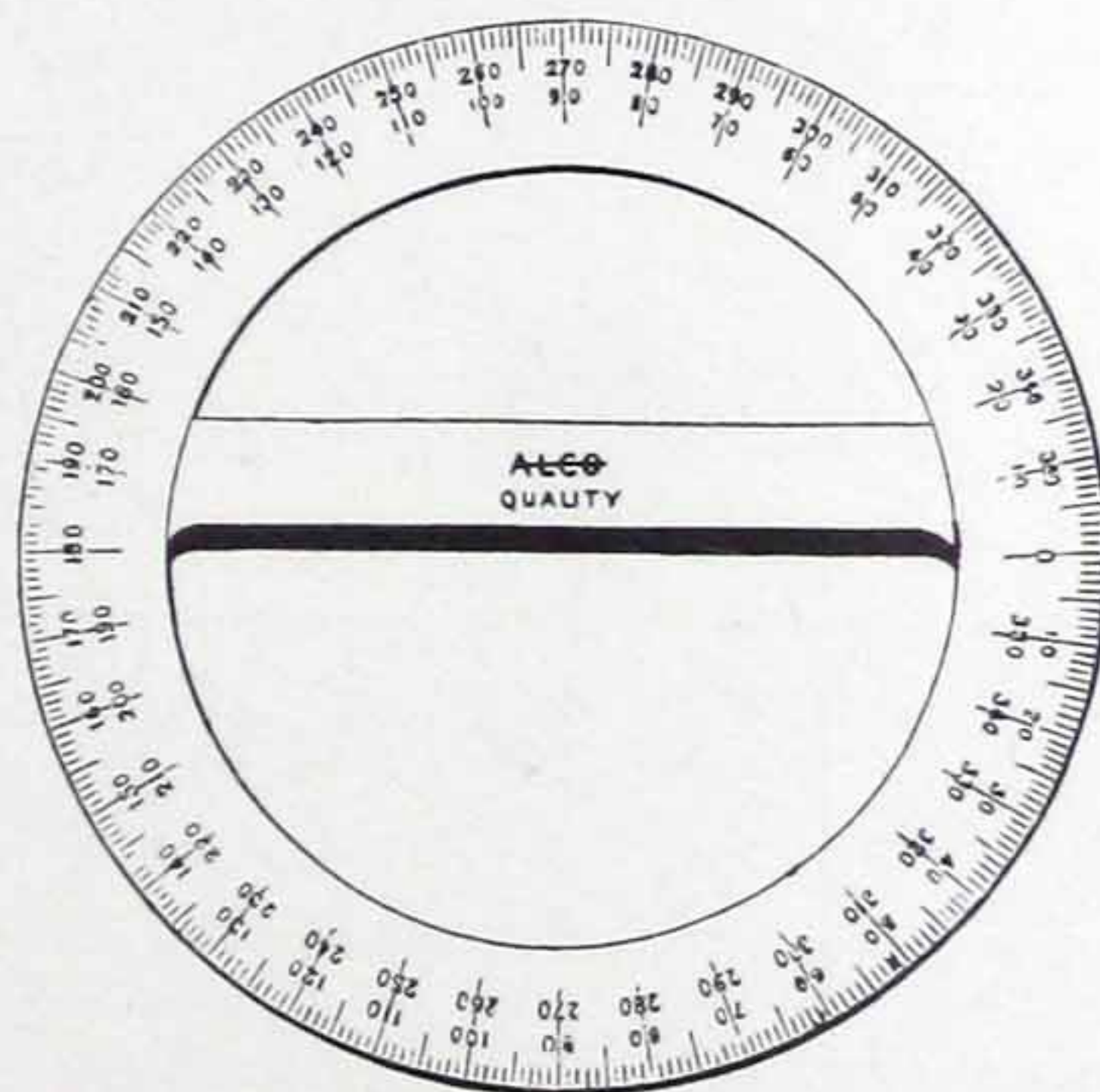
SEE PRICE LIST IN BACK OF CATALOG

ZENITH PROTRACTORS



Nos. 2121-22

- No. 2121.** Circular, German Silver Protractor, 8 in., divided to $\frac{1}{4}$ degrees, vernier reading to 1 minute. Movable arm 6 in. long. Horn Center.....Code Word, **SCHOLIAST**
- No. 2121C.** Circular Protractor No. 2121 in silk velvet lined morocco case ...Code Word, **SCHOLIUM**
- No. 2122.** Same as No. 2121 but 10 in. divided to $\frac{1}{4}$ degrees, vernier reading to 1 minute. Movable arm 6 $\frac{1}{2}$ in. long. Horn Center.....Code Word, **SCHOOLER**
- No. 2122C.** Circular Protractor No. 2122 in silk velvet lined morocco case....Code Word, **SCHOONER**

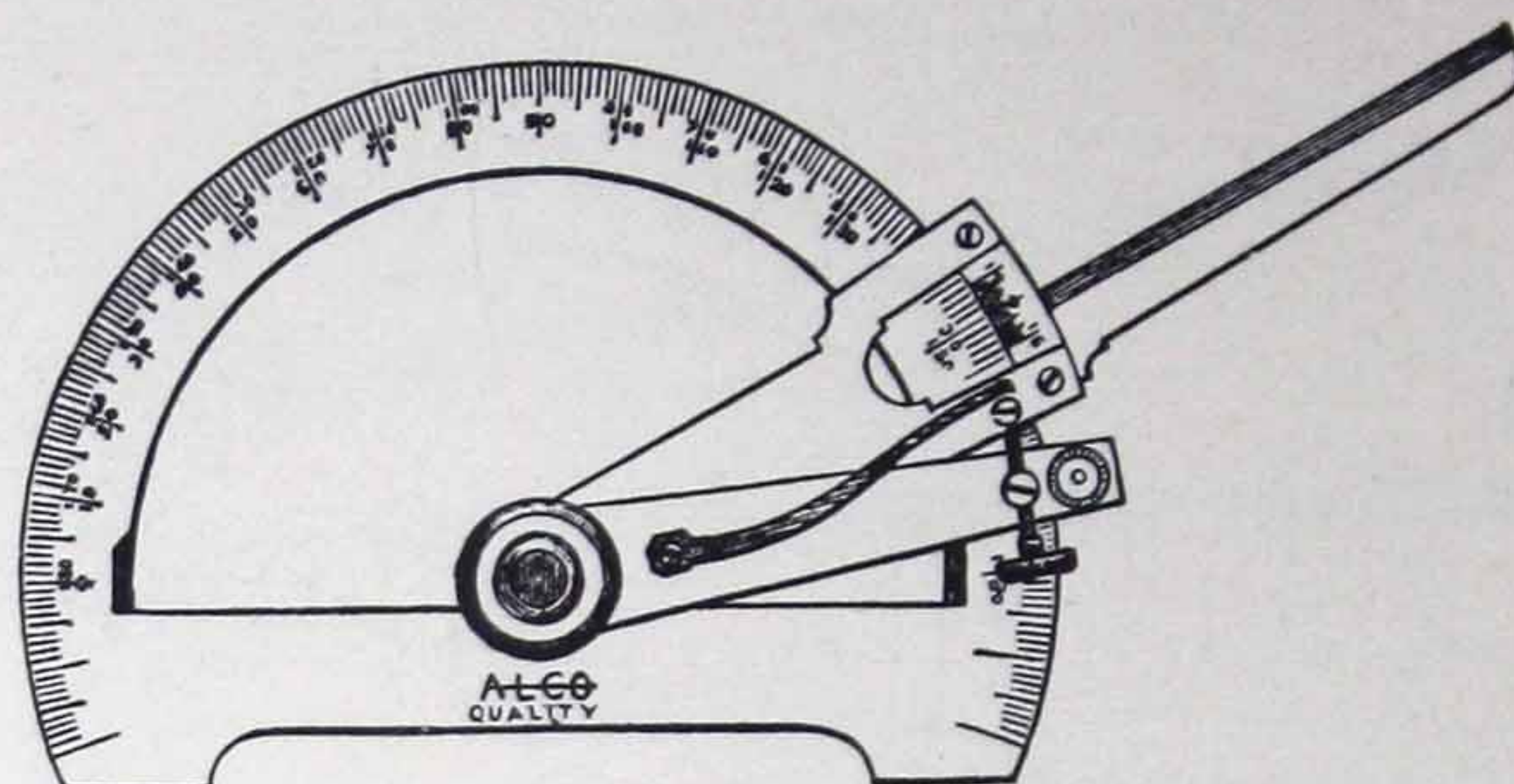


No. 2126

- No. 2126.** Circular German Silver Protractor, 6 in., beveled edge, divided to $\frac{1}{2}$ degrees. Each.....Code Word, **SCIMITAR**

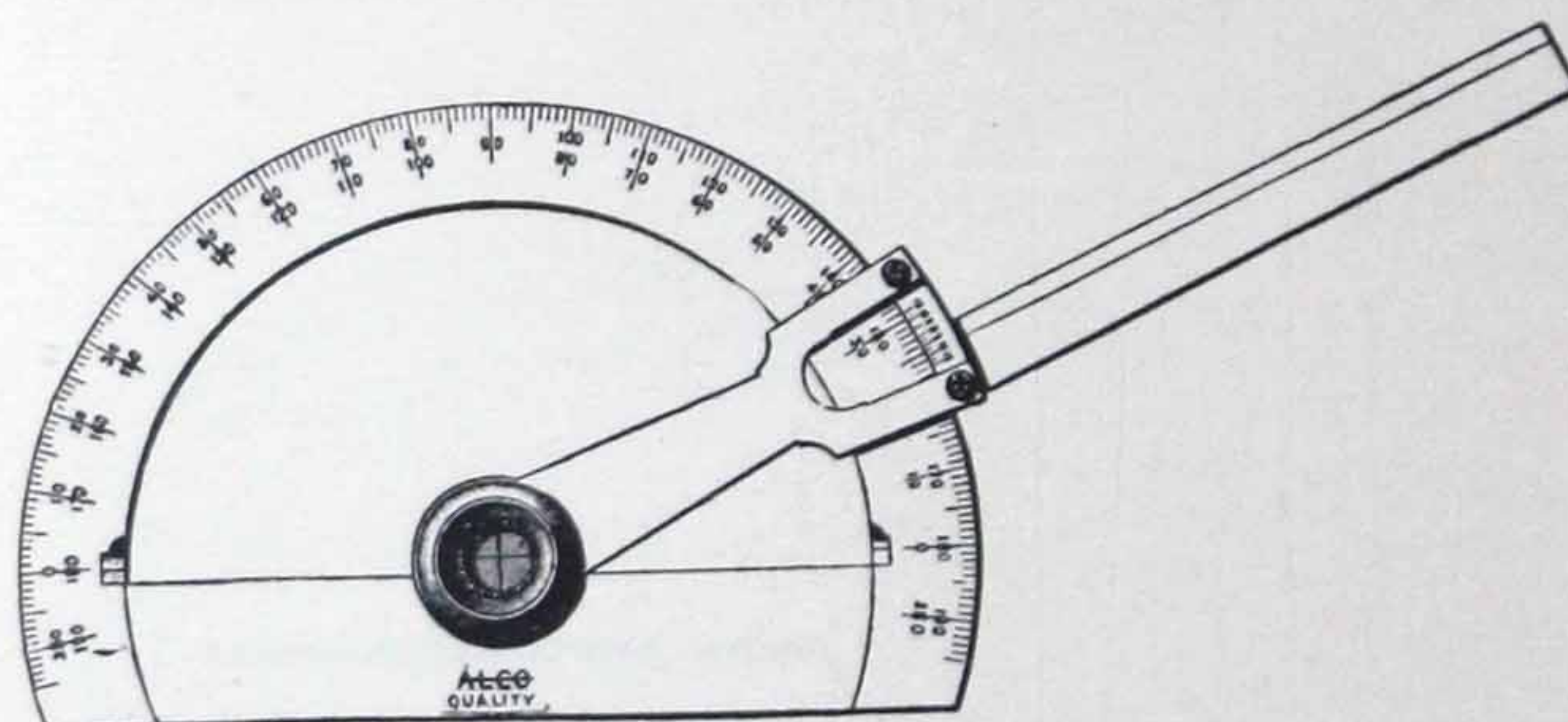
SEE PRICE LIST IN BACK OF CATALOG

ZENITH PROTRACTORS



Nos. 2128-29

- No. 2128.** Semicircular German Silver Protractor, 8 in., divided to $\frac{1}{4}$ degrees, vernier reading to 1 minute. Movable arm 6 in. long, with clamp screw and micrometer to vernier. Horn Center.....Code Word, **SCORIA**
- No. 2128C.** Semicircular Protractor No. 2128 in silk velvet lined morocco case...Code Word, **SCORIUM**
- No. 2129.** Same as No. 2128 but 10 in. and movable arm $6\frac{1}{2}$ in. long.....Code Word, **SCORNER**
- No. 2129C.** Semicircular Protractor No. 2129 in silk velvet lined morocco case...Code Word, **SCORCHER**

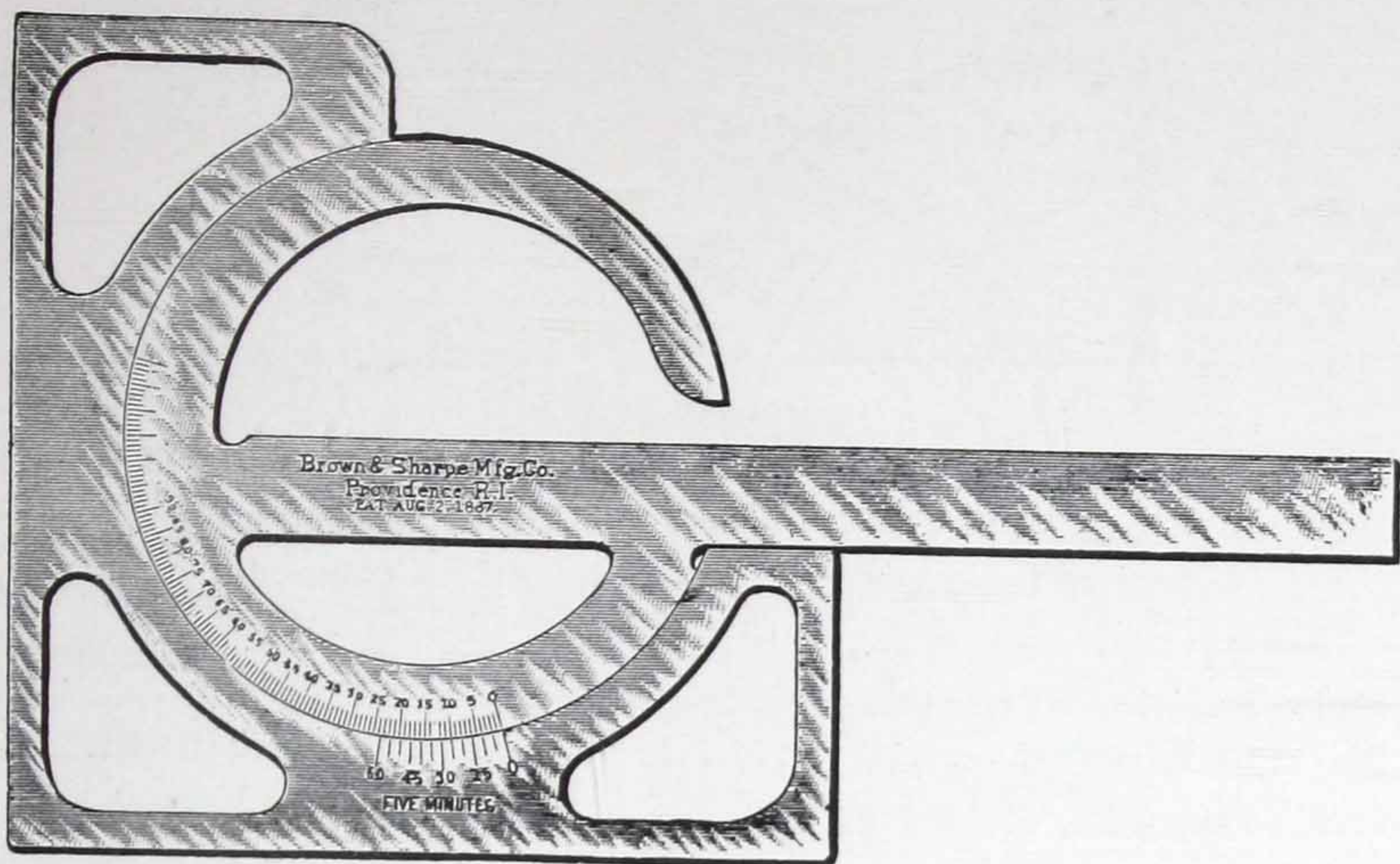


Nos. 2136-37

- No. 2136.** Semicircular German Silver Protractor, 8 in., and movable arm 6 in. long, divided to $\frac{1}{4}$ deg., vernier reading to 1 minute.....Code Word, **SCOUT**
- No. 2136C.** Semicircular Protractor No. 2136 in silk velvet-lined morocco case...Code Word, **SCOUTING**
- No. 2137.** Same as No. 2136, but 10 in., and movable arm $6\frac{1}{2}$ in. long, divided to $\frac{1}{4}$ deg., vernier reading to 1 minute.....Code Word, **SCOW**
- No. 2137C.** Semicircular Protractor No. 2137 in silk velvet-lined morocco case...Code Word, **SCOWL**

SEE PRICE LIST IN BACK OF CATALOG

DRAFTSMEN'S PROTRACTORS



No. 2150

- No. 2150.

Draftsmen's Steel Protractor with 8½ in. blade, graduated to single degrees, vernier reading to 5 minutes.....

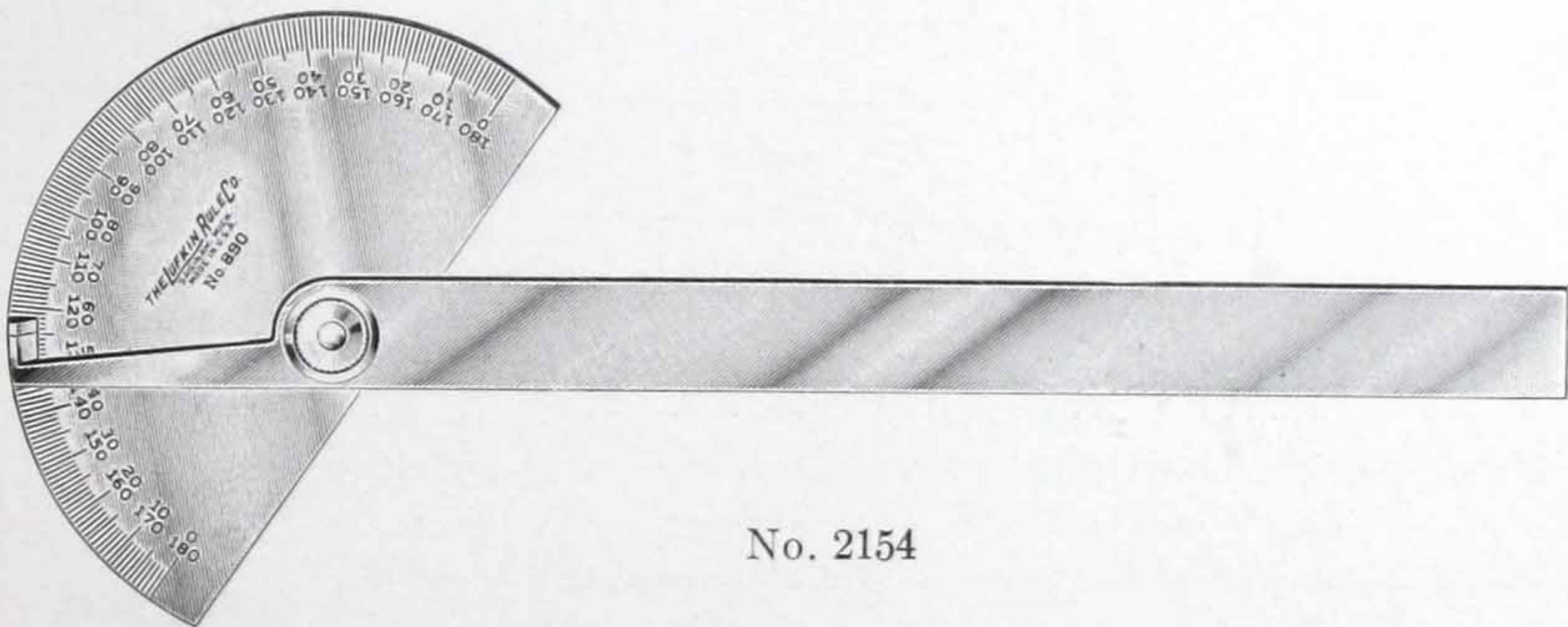
Code Word

SCRAWL
- No. 2150C.

Draftsmen's Steel Protractor No. 2150. In morocco case.....

SCRAWLER

Draftsmen's Protractor No. 2150 is made of sheet steel and is light and durable. This Protractor can be quickly set to any angle. It can be used either side up and on either of the two outside edges of the frame. Advantageously used in dividing circles, transferring angles, or laying off given angles, without resetting, on either side of a line. It forms a convenient extension of a T-square and frequently takes the place of 45-degree and 60-degree angles.



No. 2154

- No. 2154.

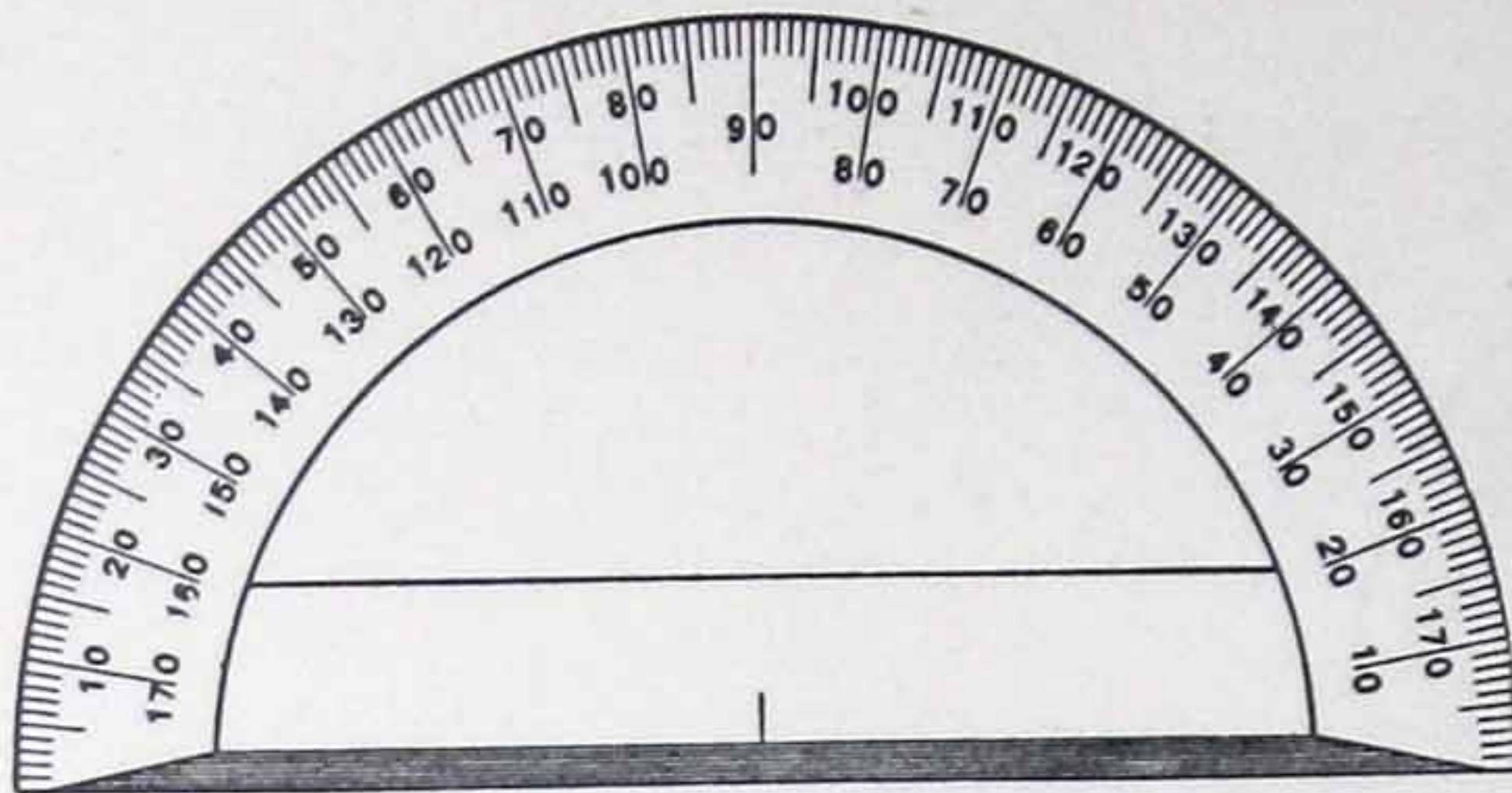
Steel Protractor. Semi-circular head, graduated 0 to 180° with two rows of figures reading in opposite directions. Blade 6 inches long with spring tension and knurled set screw.....

Code Word

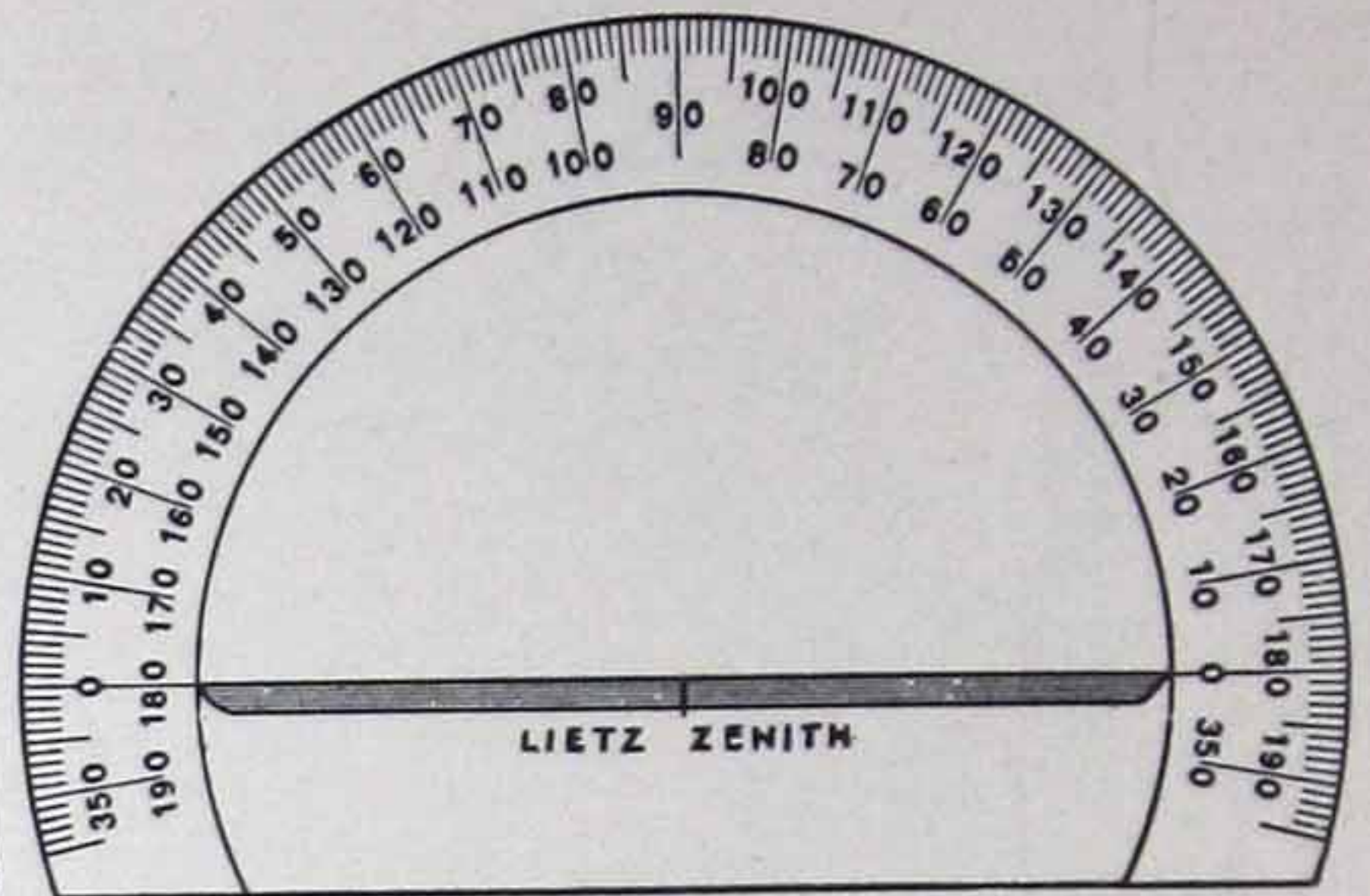
SCREAM

SEE PRICE LIST IN BACK OF CATALOG

ZENITH PROTRACTORS



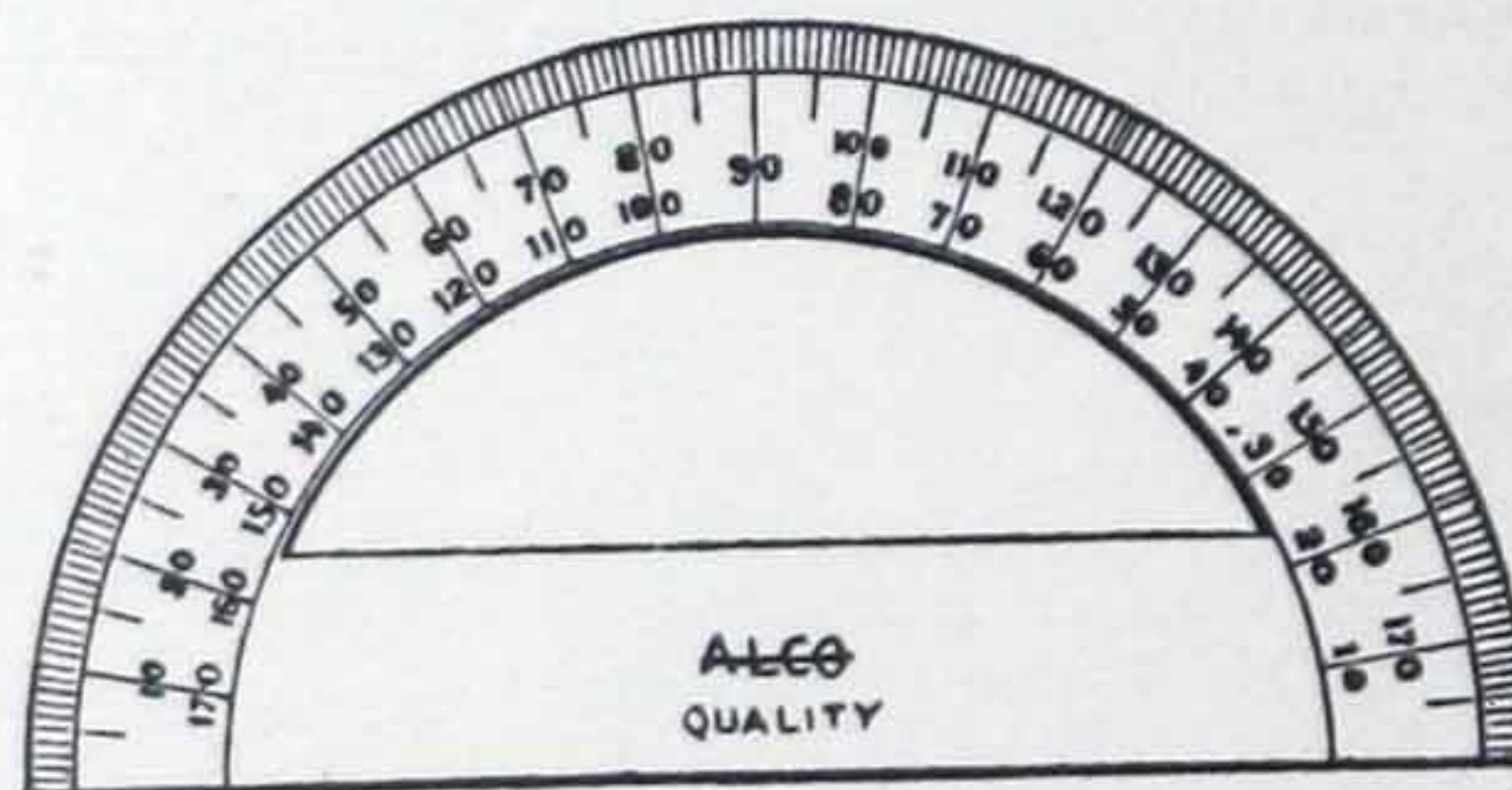
Nos. 2161-65
Center on outer edge



Nos. 2171-73
Center on inner edge

		Code Word
No. 2161.	Semicircular German silver Protractor, 5 in., divided to $\frac{1}{2}$ degree.....	SCRIBE
No. 2163.	Do., 6 in., divided to $\frac{1}{4}$ degree.....	SCRIMP
No. 2165.	Do., 8 in., divided to $\frac{1}{4}$ degree.....	SCRIPT
No. 2171.	Semicircular German silver Protractor, 5 in., beveled edge, divided to $\frac{1}{2}$ degree.....	SCROFULA
No. 2173.	Do., 6 in., divided to $\frac{1}{4}$ degree.....	SCROLL

GERMAN SILVER PROTRACTORS

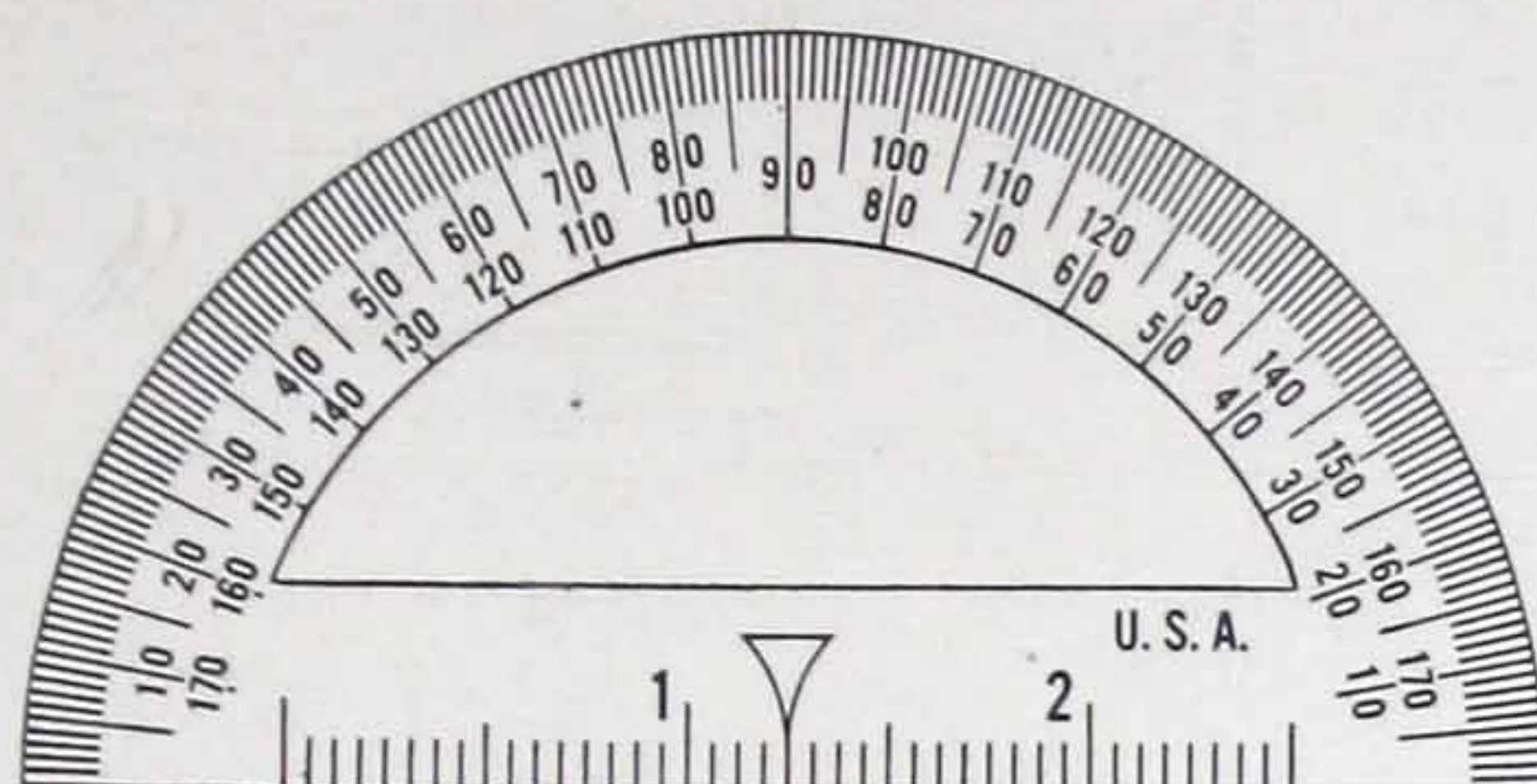


Nos. 2180-84

		Code Word
No. 2180.	Semicircular German silver Protractor, 4 in., divided to 1°	SCUFFLE
No. 2181.	Semicircular German silver Protractor, 5 in., divided to $\frac{1}{2}^{\circ}$	SCULLERY
No. 2182.	Semicircular German silver Protractor, 6 in., divided to $\frac{1}{2}^{\circ}$	SCULLION
No. 2184.	Semicircular German silver Protractor, 8 in., divided to $\frac{1}{2}^{\circ}$	SCULPTOR

SEE PRICE LIST IN BACK OF CATALOG

METAL PROTRACTORS



Brass

- | | | Code Word |
|-----------|---|-----------|
| No. 2189. | Semicircular, Etched Graduations, $3\frac{1}{2}$ inch, divided to 1° | SCUPPER |
| No. 2191. | Semicircular, Etched Graduations, $4\frac{1}{4}$ inch, divided to 1° | SCURF |
| No. 2192. | Semicircular, Etched Graduations, $5\frac{1}{2}$ inch, divided to $\frac{1}{2}^\circ$ | SCURRY |
| No. 2194. | Semicircular, Stamped Graduations, $3\frac{1}{2}$ inch, divided to 1° | SCUT |

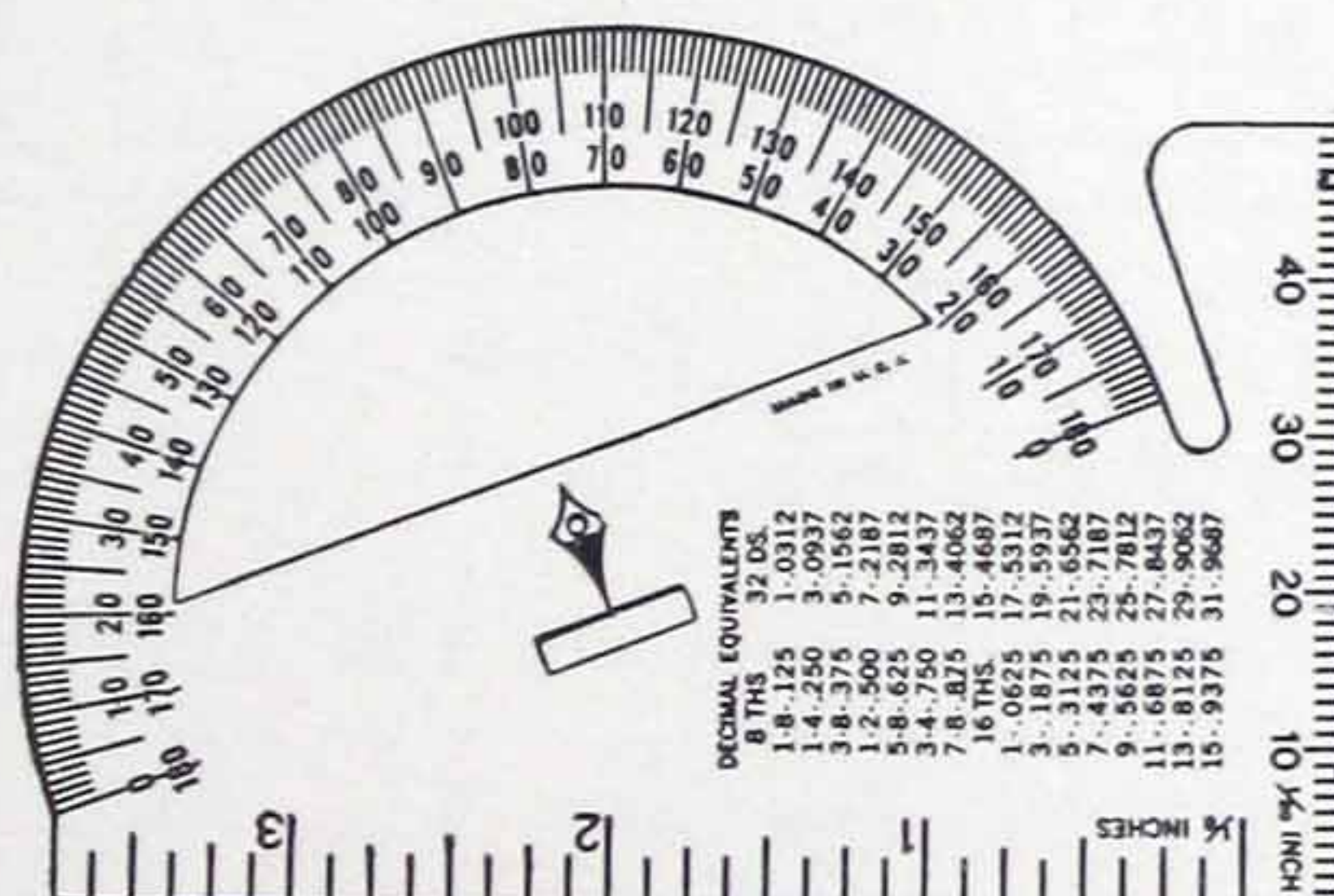
Nickel Plated

- | | | Code Word |
|-----------|--|-----------|
| No. 2195. | Semicircular, Stamped Graduations, $3\frac{1}{2}$ inch, divided to 1° | SCUTTLE |

Lithographed White Enameled

- | | | Code Word |
|--------------------------|--|-----------|
| No. 2196. | Semicircular Protractor, $3\frac{1}{2}$ inch, divided to 1° | SEALY |
| No. 2196 $\frac{1}{2}$. | Semicircular Protractor, $4\frac{1}{4}$ inch, divided to 1° | SEALYRE |

COMBINATION PROTRACTOR



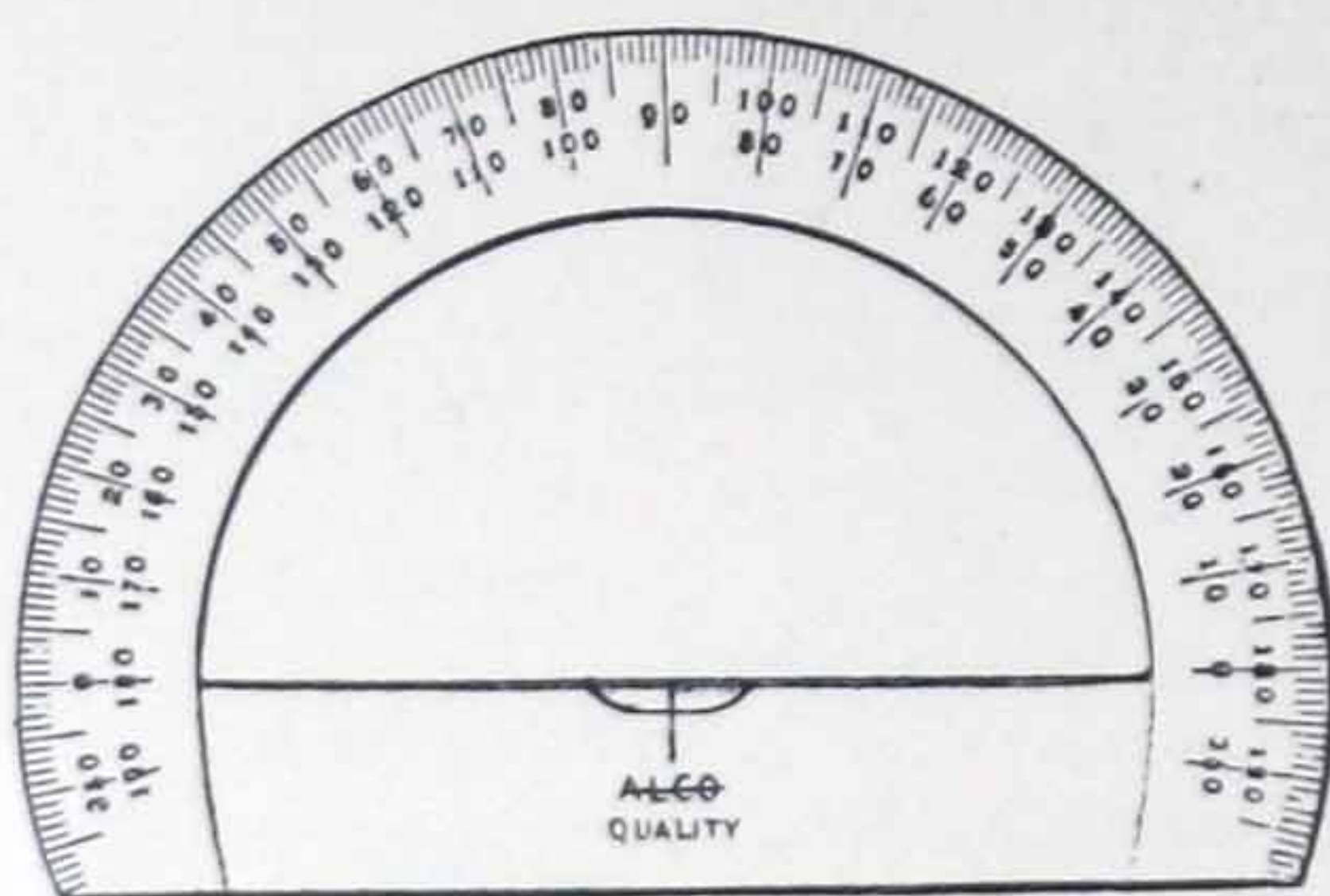
No. 2199

- | | | Code Word |
|-----------|---|-----------|
| No. 2199. | Lithographed, White Enameled Combination Protractor, Ruler and Angle..... | SEATRE |

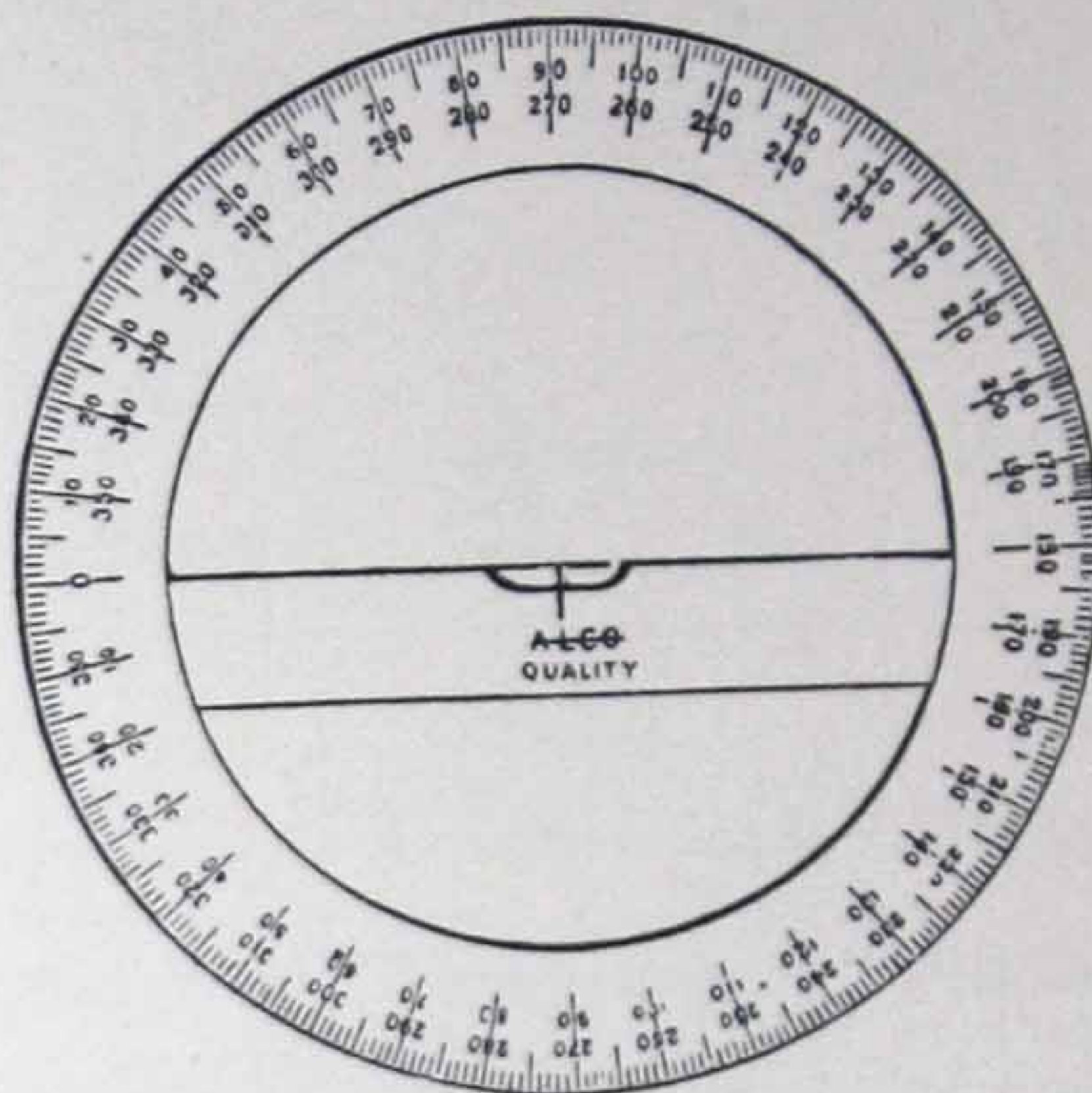
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TRANSPARENT CELLULOID PROTRACTORS

Heavy, with Beveled Edges

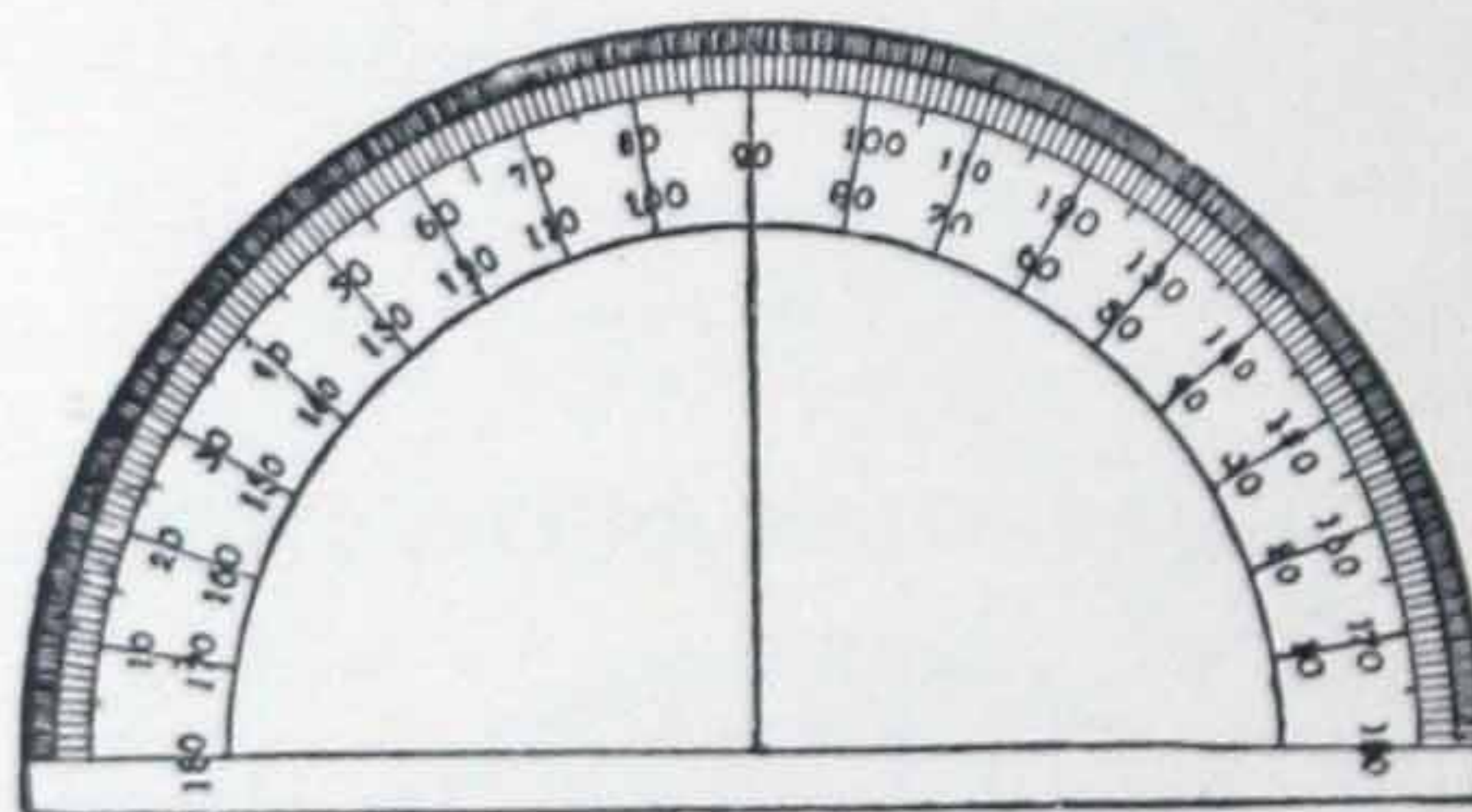


Nos. 2210-11



Nos. 2215-17

- | | | Code Word |
|-----------|--|-----------------|
| No. 2210. | Semicircular Amber Protractor, 6 in., divided to $\frac{1}{2}^{\circ}$ | SEARCH |
| No. 2211. | Semicircular Amber Protractor, 8 in., divided to $\frac{1}{2}^{\circ}$ | SEARCHER |
| No. 2215. | Circular Amber Protractor, 6 in., divided to $\frac{1}{2}^{\circ}$.. | SEARY |
| No. 2216. | Circular Amber Protractor, 8 in., divided to $\frac{1}{2}^{\circ}$.. | SEASOR |
| No. 2217. | Circular Amber Protractor, 10 in., divided to $\frac{1}{2}^{\circ}$.. | SEATING |

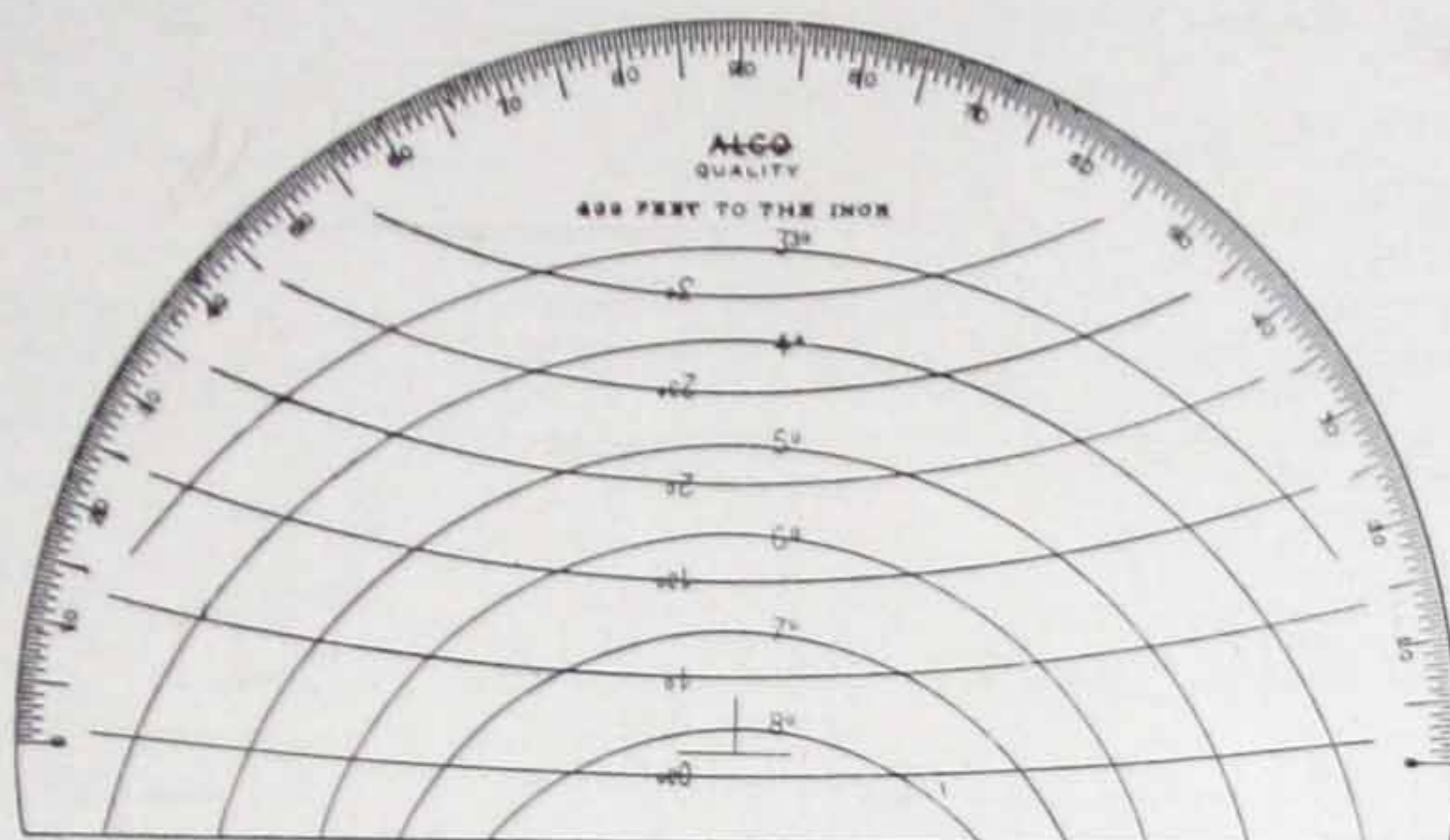


Nos. 2230-35

- | | | Code Word |
|-----------|---|-----------------|
| No. 2230. | Semicircular Celluloid Protractor, 4 in., divided to 1° | SECANT |
| No. 2231. | Semicircular Celluloid Protractor, 5 in., divided to $\frac{1}{2}^{\circ}$ | SECCO |
| No. 2232. | Semicircular Celluloid Protractor, 6 in., divided to $\frac{1}{2}^{\circ}$ | SECEDE |
| No. 2234. | Semicircular Celluloid Protractor, 8 in., divided to $\frac{1}{2}^{\circ}$ | SECEDER |
| No. 2235. | Semicircular Celluloid Protractor, 10 in., divided to $\frac{1}{2}^{\circ}$ | SECEDING |
| No. 2237. | Circular Celluloid Protractor, 4 in., divided to 1° | SECENA |
| No. 2238. | Circular Celluloid Protractor, 6 in., divided to $\frac{1}{2}^{\circ}$ | SECERO |

SEE PRICE LIST IN BACK OF CATALOG

TRANSPARENT CELLULOID PROTRACTORS

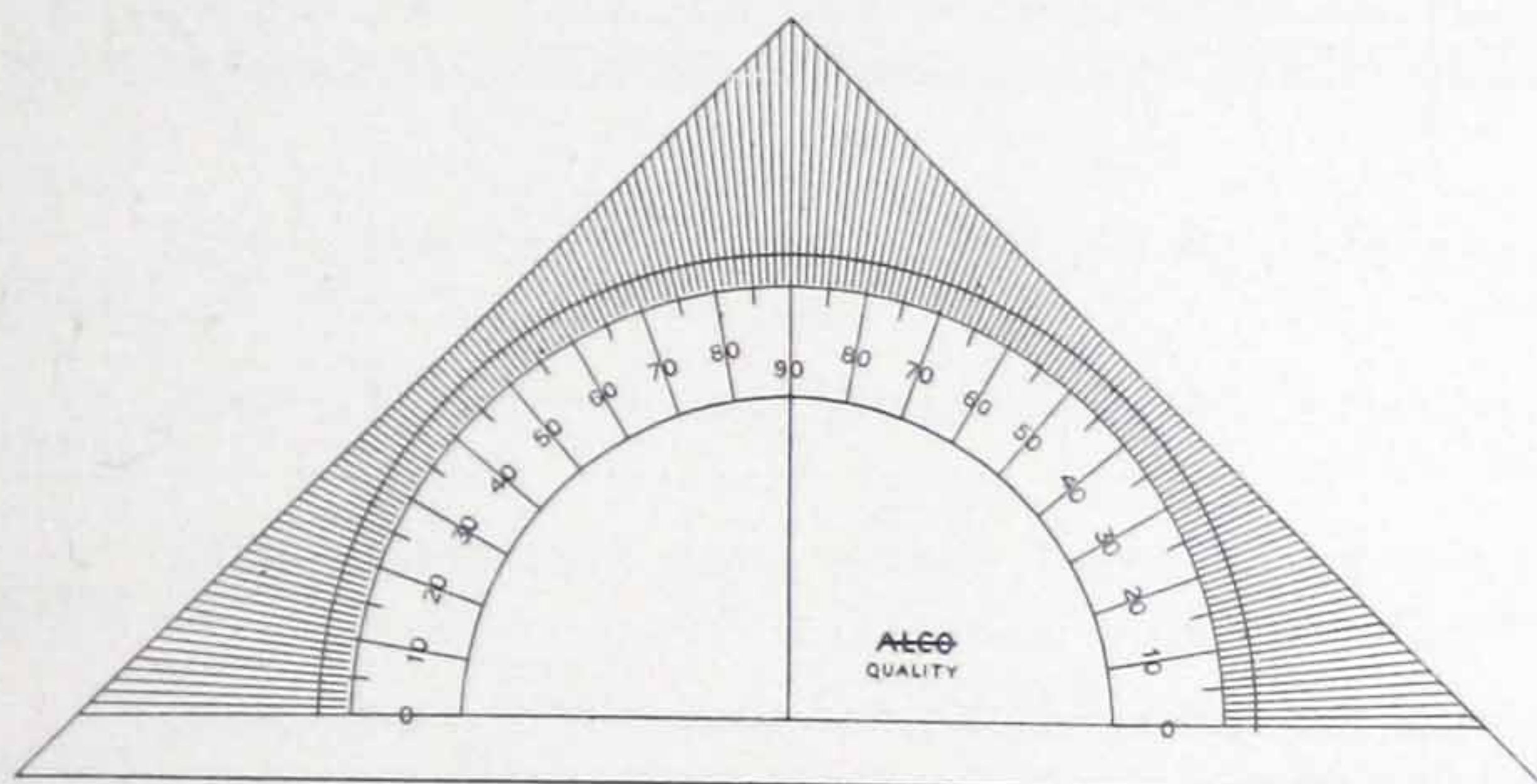


- No. 2241.** Transparent Railroad Curve Protractor, 10 in., divided to $\frac{1}{2}^\circ$ with circular curves from 1° to 20° , scale 100 feet to the inch.....

Code Word

SECLAT

TRANSPARENT TRIANGLE PROTRACTORS



Nos. 2250-52

- No. 2246.** Celluloid Triangle Protractor, $30 \times 60^\circ$, 6 in., divided to 1°

Code Word

SECLINE

- No. 2250.** Celluloid Triangle Protractor, 45° , 5 in., divided to 1° ..

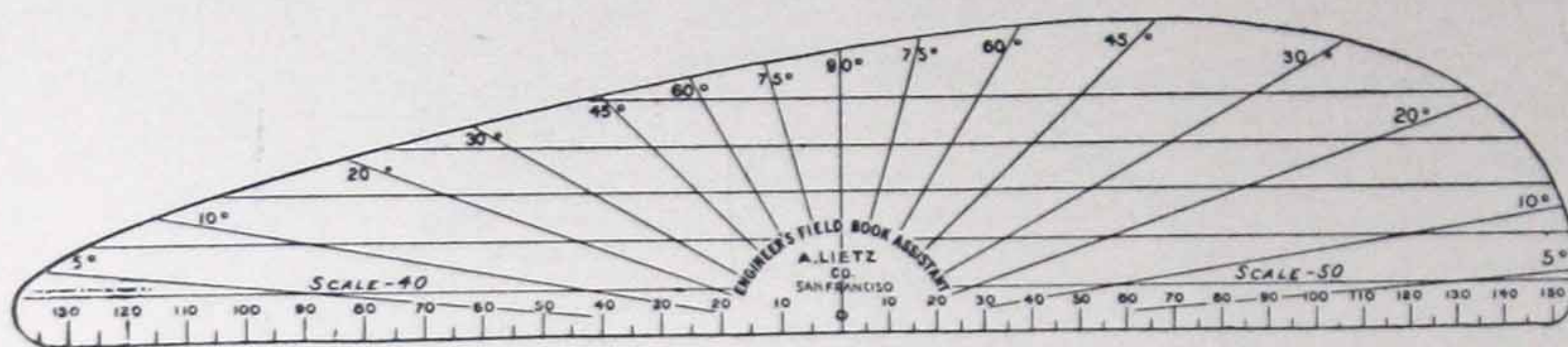
SECLUDE

- No. 2252.** Celluloid Triangle Protractor, 45° , 7 in., divided to 1° ..

SECOR

SEE PRICE LIST IN BACK OF CATALOG

TRANSPARENT FIELD BOOK PROTRACTOR

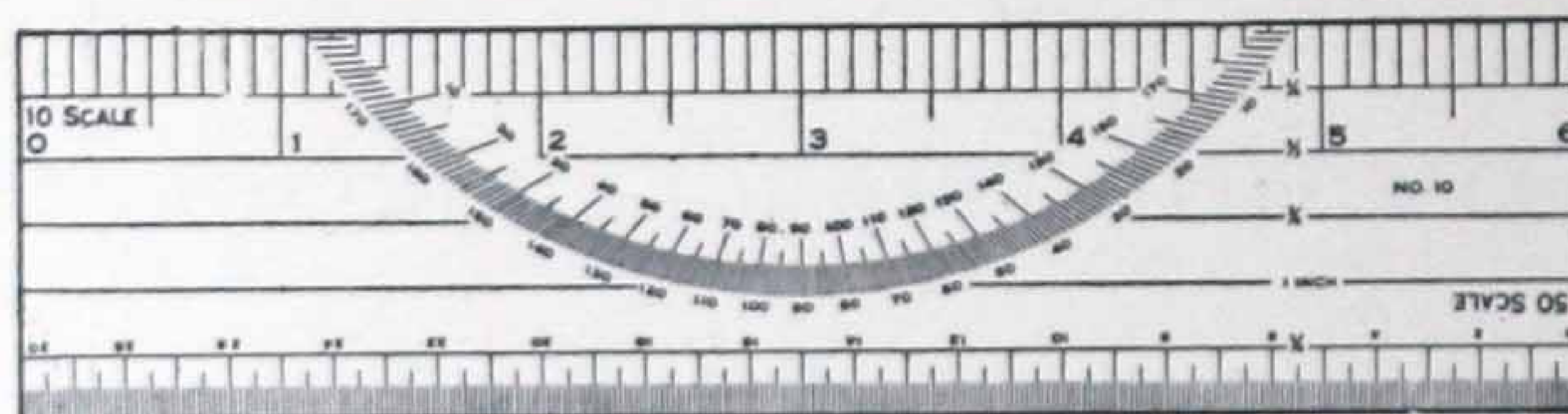


Code Word

No. 2256. Engineers' Field Book Assistant; each..... **HAMBEST**

The Engineers' Field Book Assistant combines in itself a straight-edge, irregular curve, parallel ruler, protractor and scale. Made of thin transparent amber, about $6\frac{1}{2}$ inches long.

TRANSPARENT SCALE PROTRACTORS



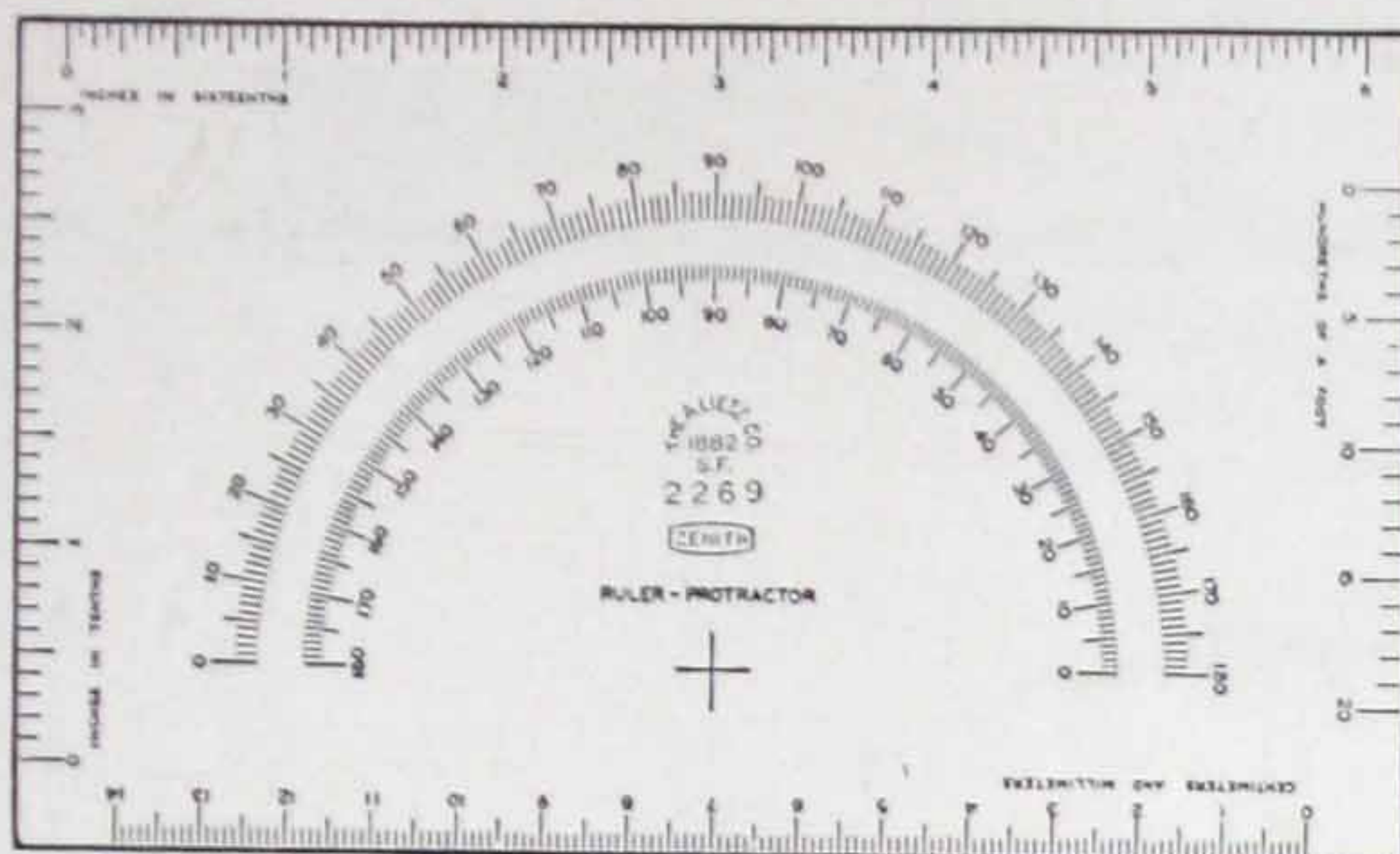
Code Word

- No. 2259. Transparent Parallel Ruler and Protractor with 10x20 scales..... **HAM**
- No. 2260. Transparent Parallel Ruler and Protractor, with 10x50 scales..... **HAMBAD**
- No. 2261. Transparent Parallel Ruler and Protractor, with 30x40x50 scales..... **HAMBACK**
- No. 2262. Transparent Parallel Ruler and Protractor, with 20x40 scales..... **HAMBART**
- No. 2263. Transparent Parallel Ruler and Protractor, with inch and metric scales..... **HAMBASE**
- No. 2264. Transparent Parallel Ruler and Protractor, with inch and 10 scales..... **HAMBAT**
- No. 2265. Transparent Parallel Ruler and Protractor, with $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$ and 1-inch scales..... **HAMBEL**
- No. 2266. Transparent Parallel Ruler and Protractor for U. S. Geological Survey Maps, divided 1:62500..... **HAMBENT**

Above Protractors are made of transparent amber, 6 inches long. They combine the advantages of the scale and the protractor. Lines can be drawn at any desired angle or parallel to each other without measuring. Excellent for field book use. Can also be used for inscribing arcs or circles.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ TRANSPARENT RULER AND PROTRACTOR

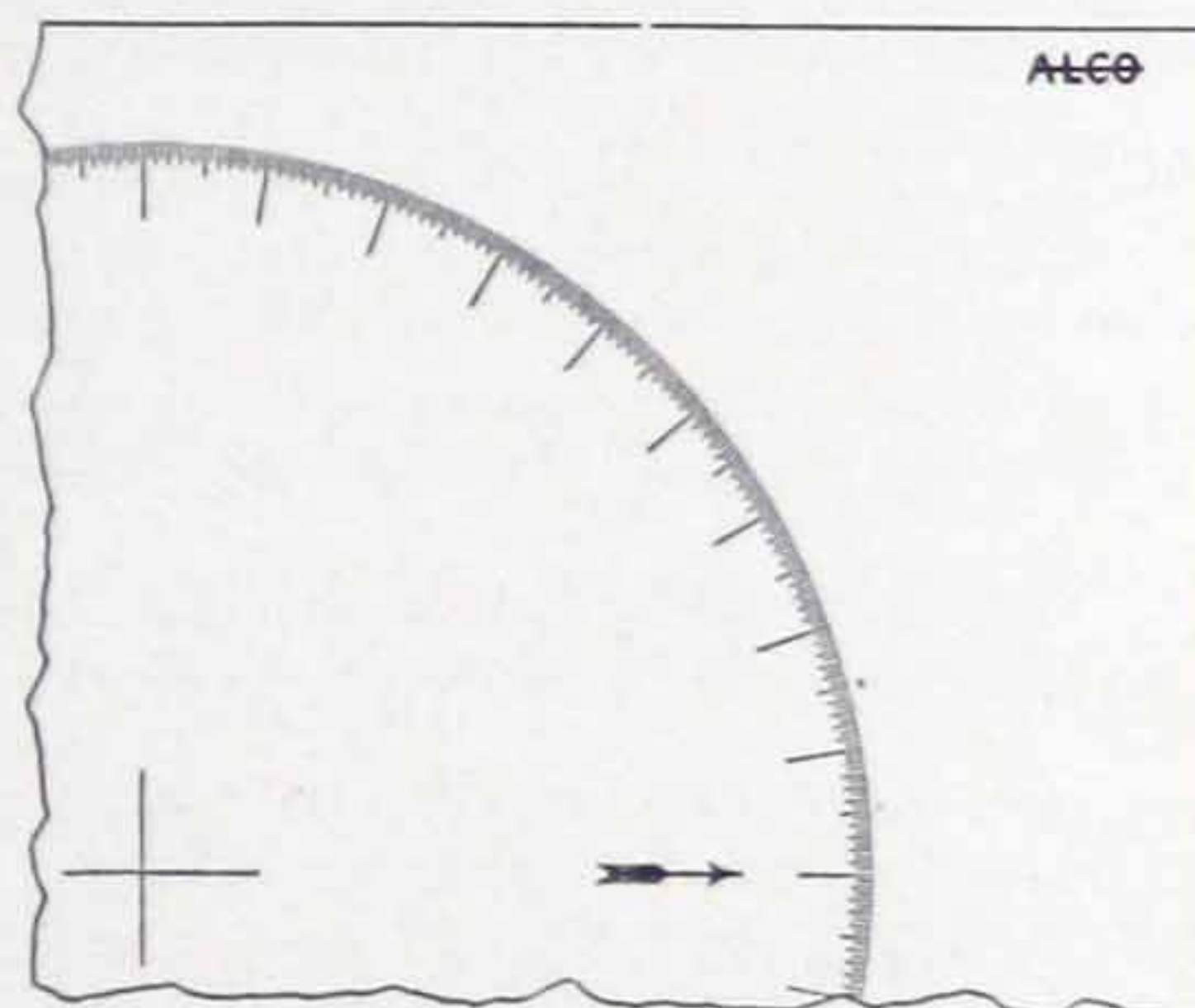


No. 2269

Code Word

- No. 2269.** Transparent Ruler and Protractor, $3\frac{3}{4}$ in. by $6\frac{1}{2}$ in., divided inches in sixteenths, centimeters and millimeters, inches in tenths and hundredths of a foot. . . . **SECOSH**

PAPER PROTRACTORS



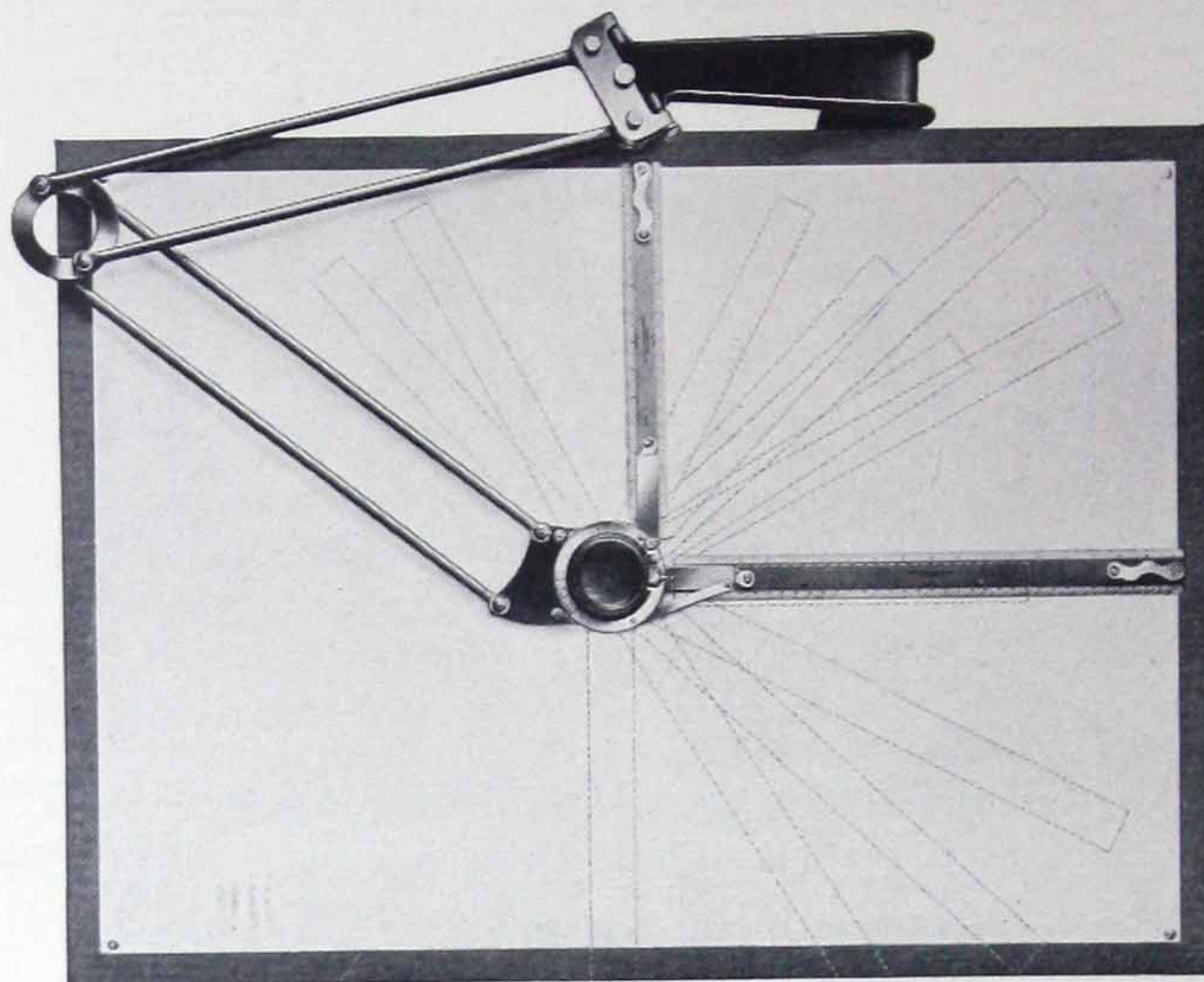
Nos. 2272-2275

Code Word

- No. 2272.** Circular Protractor on Bristol Board, 8 in. diam. in $\frac{1}{4}^\circ$ **SEAL**
No. 2273. Circular Protractor on Bristol Board, 14 in. diam. in $\frac{1}{4}^\circ$ **SEAMY**
No. 2274. Circular Protractor on Tracing Paper, 8 in. diam. in $\frac{1}{4}^\circ$ **SEANCE**
No. 2275. Circular Protractor on Tracing Paper, 14 in. diam. in $\frac{1}{4}^\circ$ **SEAR**

SEE PRICE LIST IN BACK OF CATALOG

THE UNIVERSAL DRAFTING MACHINE



Cut shows Mid-Anchor Machine

The Universal Drafting Machine consists of two parallelograms, a protractor, and a square having graduated ruling edges. The blades of the square are interchangeable for all graduations.

The two parallelograms joined together constitute an arm which, anchored to the board, gives the protractor and square a parallel motion about the drawing. This form of parallel motion permits either zero on the ruling edges to be instantly placed at any point on the drawing, by a single direct movement, and a line being drawn along the graduated ruling edge, just the exact length required.

A conveniently arranged protractor permits the square to be set at any angle, and it then has the same parallel motion about the board as when set at zero. Machines are furnished with either of the three following protractors.

STANDARD PROTRACTOR. Has graduated arc allowing square to be set at any angle, and is provided with automatic stops allowing the square to be instantly set at 30°, 45°, 60° and 90°, without stopping to read or clamp the protractor.

ARCHITECTURAL AND STRUCTURAL PROTRACTOR. Special graduations are added to this protractor giving one-fifth, one-fourth and one-third roof pitches each way from zero, also special graduations to give two inches to the foot each way from zero.

CIVIL ENGINEERS' PROTRACTOR. This protractor has two independent swinging motions, the same as on a transit. The protractor is graduated to one-half degrees and the vernier reads to minutes. With the aid of this protractor it is a simple matter to duplicate work (done in the field) on the drawing, directly from the field notes.

HARDENED JOINT AND SOLID ROD DRAFTING MACHINES

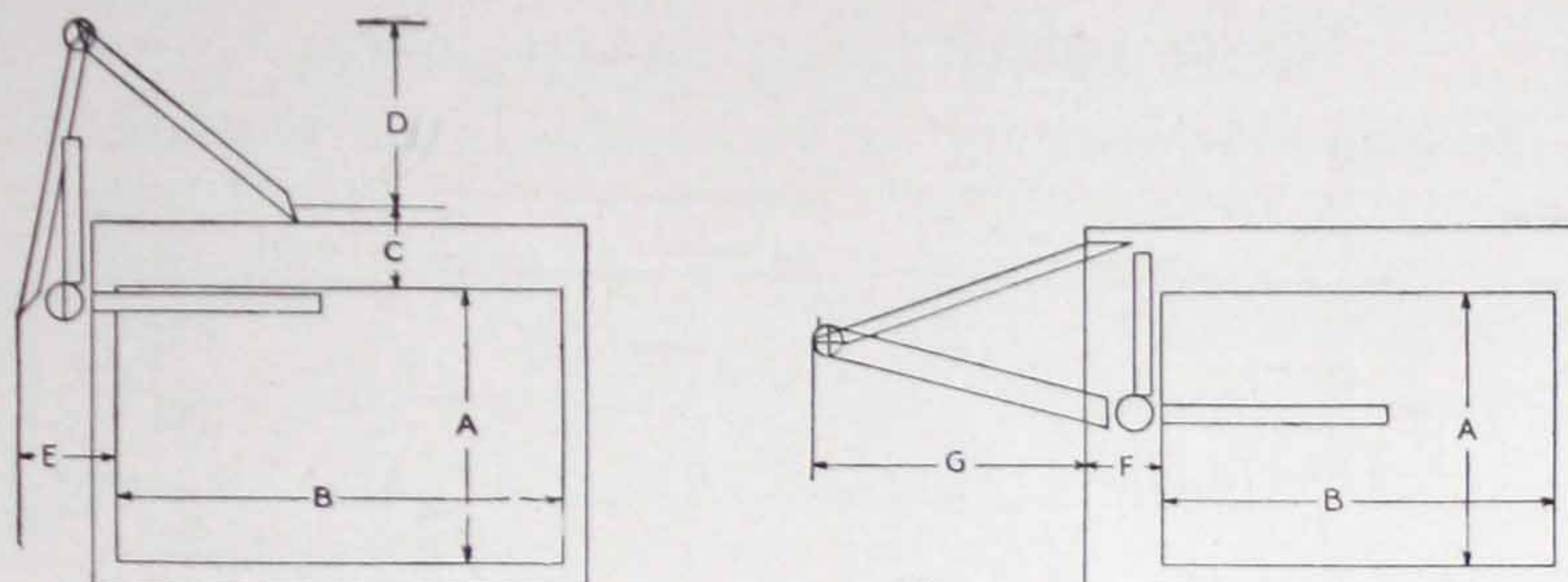
The Hardened Joint Solid Rod Drafting Machine is a development from the original construction of the Drafting Machine. Hardened, ground and polished straight cylindrical pins working in hardened, ground and polished bearings form the bearings of this machine, and if kept properly lubricated and free from dirt they will give many years of good service with no perceptible wear.

BALL BEARING TUBULAR ROD DRAFTING MACHINES

The Ball Bearing Tubular Rod Drafting Machine is an achievement that makes the Drafting Machine practically ideal. It has absolutely no play in the bearings and is frictionless. It is light in weight and possesses great rigidity, and is exceedingly accurate, and the motion is smooth and light.

Complete booklet fully describing Universal Drafting Machines and accessories mailed on application.

THE UNIVERSAL DRAFTING MACHINE



CAPACITIES AND CLEARANCES

Mid-Anchor Form

Size Length of Rods	Rated Capacity		Maximum Capacity		Max. Clearance for extreme corner position only		
	A	B	A	B	C	D	E
18	20	30	24	36	6"	12"	7"
21	24	36	27	45	7"	14"	7"
24	30	42	30	52	8"	16"	7"
28	36	50	36	60	9"	19"	7"
32	40	60	40	70	10"	22"	7"
36	47	60	48	78	12"	24"	7"

Corner Anchor Form

Size Length of Rods	Rated Capacity		Maximum Capacity		Max. Clearance for extreme corner position only	
	A	B	A	B	F	G
18	18	24	20	30	7"	18"
21	20	30	24	32	7"	21"
24	24	36	27	38	7"	24"
28	30	42	32	45	7"	28"
32	32	48	36	51	7"	32"
36	36	54	40	60	7"	36"

PRICE LIST

HARDENED JOINT AND SOLID ROD DRAFTING MACHINES

Prices of Machine only, without scales

	Standard Protractor	Architect's Protractor	Civil Engineer's Protractor
Mid-Anchor, sizes 18, 21, 24 or 28.....			
Corner Anchor, sizes 18, 21, 24 or 28.....			
Mid-Anchor, sizes 32 and 36.....			
Corner Anchor, sizes 32 and 36.....			

BALL BEARING TUBULAR ROD DRAFTING MACHINES

Prices of Machine only, without scales.

	Standard Protractor	Architect's Protractor	Civil Engineer's Protractor
Mid-Anchor, sizes 18, 21, 24 or 28.....			
Corner Anchor, sizes 18, 21, 24 or 28.....			
Mid-Anchor, sizes 32 and 36.....			
Corner Anchor, sizes 32 and 36.....			
Standard or Architect's Protractor, with vernier to 5 minutes, extra.....			

THE JUNIOR DRAFTING MACHINE

The Junior Drafting Machine is a most convenient means for making small drawings at your desk, in the shop, at home, or when away on a trip.

This machine is designed to be used on a 22x28 drawing board, and its ordinary working capacity is 18x24 inches, although it will cover almost the entire board.

The protractor is graduated to degrees, is made of german silver, has automatic stops for the zero, 30, 45, 60 and 90 degree angles both ways. The square may be swung through 180 degrees and may be clamped at any angle.

The same scales may be used with this machine as on the larger machines, although the short lengths are preferable.

	Price without scales.
Mid-Anchor, Standard Protractor.....	
Corner Anchor, Standard Protractor.....	

SCALES AND STRAIGHTEDGES FOR DRAFTING MACHINES LISTED ON PAGE 298.

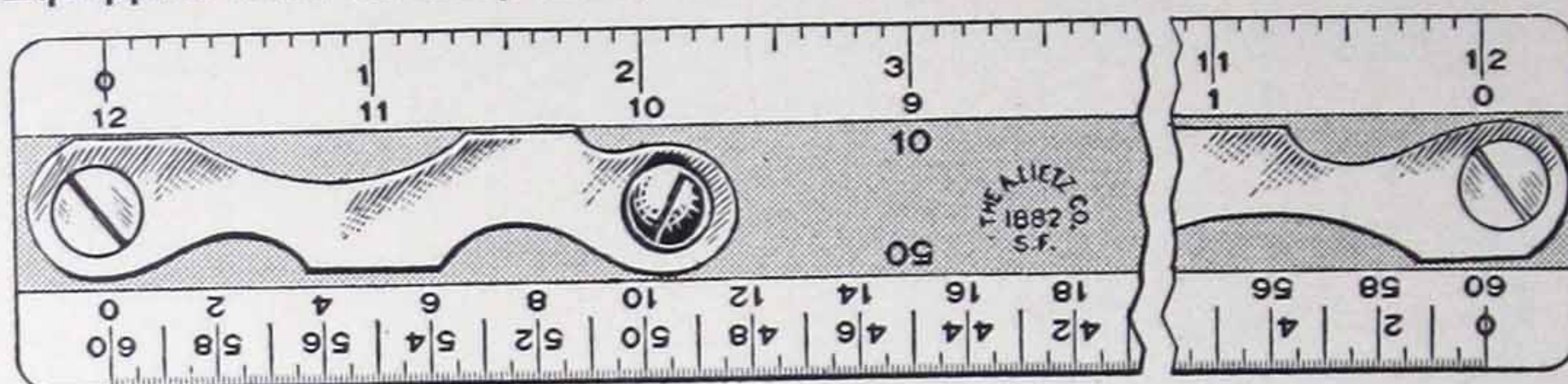
SEE PRICE LIST IN BACK OF CATALOG

LIETZ CEL-O-MET WHITE EDGE SCALES

Trade Mark

FOR DRAFTING MACHINES

Equipped with chuck plates, will fit all standard Drafting Machines.



For complete description of Lietz Cel-O-Met Scales see page 304.

	6 in. Code Word	12 in. Code Word	18 in. Code Word	24 in. Code Word
No. 2295A White Edge Cel-O-Met Scales, full and half size	SECUAS	SECUAT	SECUEAE	SECVA
No. 2295B Ditto, $\frac{1}{4}$ " and $\frac{1}{8}$ " to the foot.....	SECUBS	SECUBT	SECUBE	SECVAB
No. 2295C Ditto, 1" and $\frac{1}{2}$ " to the foot.....	SECUCS	SECUCT	SECUCE	SECVACK
No. 2295D Ditto, $\frac{3}{4}$ " and $\frac{3}{8}$ " to the foot.....	SECUDS	SECUDT	SECUDE	SECVAD
No. 2295E Ditto, 3"-1 $\frac{1}{2}$ "-3 $\frac{1}{4}$ "-3 $\frac{3}{8}$ " to the foot.....	SECUES	SECUET	SECUEE	SECVAFT
No. 2295F Ditto, 1"-1 $\frac{1}{2}$ "-1 $\frac{1}{4}$ "-1 $\frac{1}{8}$ " to the foot.....	SECUFS	SECUFT	SECUFE	SECVAG
No. 2295G Ditto, 10x50 parts to the inch.....	SECUGS	SECUGT	SECUGE	SECVAHL
No. 2295H Ditto, 20x40 parts to the inch.....	SECUHS	SECUHT	SECUHE	SECVAIN
No. 2295K Ditto, 30x60 parts to the inch.....	SECUKS	SECUKT	SECUEKE	SECVAK
No. 2295L Ditto, 3"-1 $\frac{1}{2}$ " to the ft.	SECULS	SECULT	SECULE	SECVALD
No. 2295M Ditto, mm- $\frac{1}{2}$ mm.....	SECUMS	SECUMT	SECUME	SECVAN
No. 2295N Ditto, 1:1-1:2.....	SECUNS	SECUNT	SECUNE	SECVAP
No. 2295P Ditto, 1:5-1:10.....	SECUPS	SECUPT	SECUEPE	SECVARA
No. 2295R Ditto, 1:15-1:25.....	SECURS	SECURT	SECURE	SECVASH

When ordering be sure to specify the LENGTH of the scales wanted as well as the catalog number or code word.

Boxwood Scales with White Edges can be furnished if so specified.

STRAIGHT EDGES FOR DRAFTING MACHINES



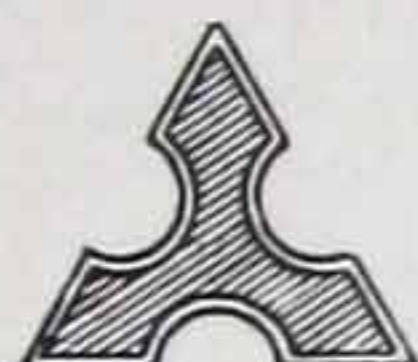
	Code Word
No. 2296A Celluloid-Lined Straightedge with chuck plate, 12 in. long..	SECWAT
No. 2296B Celluloid-Lined Straightedge with chuck plate, 18 in. long..	SECWARE
No. 2296C Celluloid-Lined Straightedge with chuck plate, 24 in. long..	SECWASH
No. 2297A Dural Metal Straightedge with two beveled edges and with chuck plate, 12 inches long.....	SECWET
No. 2297B Dural Metal Straightedge with two beveled edges and with chuck plate, 18 inches long.....	SECWICK
No. 2297C Dural Metal Straightedge with two beveled edges and with chuck plate, 24 inches long.....	SECWITH

LIETZ DRAFTSMEN'S SCALES

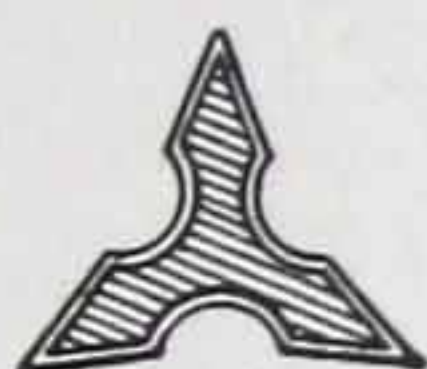
ZENITH QUALITY

Boxwood-White Edge-Cel-O-Met*

Lietz Zenith Draftsmen's Scales are manufactured by us of the very best selected materials. Constructed of the proper size and proportion, they are machine divided to United States standard measurements and the graduations are fine and clear and deeply cut. They are made in a variety of shapes, described as follows:



Triangular Scales, Regular Shape. This type of scale has the advantage of possessing six surfaces and affords the greatest range of scales.



Triangular Scales, Improved Shape. Like the regular shape, possesses six surfaces, but the concaved facet shape affords a better contact with the drawing and allows a better angle of vision. It prevents the divisions from wearing off by friction.



Flat Scales, Regular Shape. The regular shape flat scales have two bevels for graduations. The graduations are more conveniently read than on the triangular scales.



Flat Scales, Double Bevel. These scales have four bevels for graduations, but this shape necessitates the raising of the scale to bring the edge in close contact with the paper.



Flat Scales, Opposite Bevel. This type of scale is an improvement on the regular flat scale as it presents but one graduated bevel to the eye. It is easily picked up or turned.

SCALES MADE TO ORDER

We are equipped to furnish special scales of all kinds, and in order to avoid mistakes or delay in prolonged corresponding we offer the following suggestions when ordering special scales:

1—State whether Boxwood, White Edge on Boxwood or Cel-O-Met Scale is wanted.

2—State shape scale is to be. (See above.)

3—State length of scale wanted.

4—How each edge is to be graduated. State whether to be Open Divided or Full Divided.

5—State how each edge is to be numbered, from left to right or right to left or both ways.

It is advisable when ordering special scales to furnish us a sketch. This need not be accurate. All that is necessary is to show the divisions as you want them, the length of the various graduation marks, and the numbering as it is wanted.

*For description of Lietz Cel-O-Met Scales see page 304.

TRIANGULAR BOXWOOD SCALES

Machine Divided

Regular Shape



Graduated 10, 20, 30, 40, 50 and 60 parts to the inch.

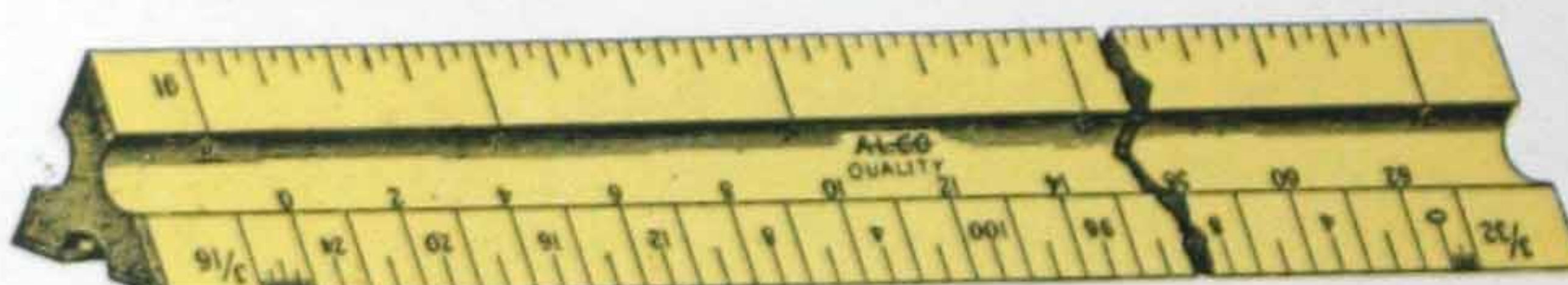
No. 2301.	6 in.....	Code Word SEDAN
No. 2302.	12 in.....	SEDATE
No. 2302S.	Same as No. 2302 but School quality.....	SEDEL

Graduated 20, 30, 40, 50, 60, 80 parts to the inch.

No. 2307.	12 in.....	SEDEGE
-----------	------------	---------------

Graduated 100, 200, 300, 400, 500, 600 parts to the foot.

No. 2312.	12 in.....	SEDGY
-----------	------------	--------------



Graduated $\frac{3}{32}$, $\frac{3}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$ and 3 inches to foot.
One edge 16 to the inch.

No. 2321.	6 in.....	Code Word SEDILIA
No. 2322.	12 in.....	SEDISH
No. 2322S.	Same as No. 2322 but School quality.....	SEEDIT

Graduated $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1, $\frac{3}{8}$, $\frac{3}{4}$, $1\frac{1}{2}$, 2, 3 and 4 inches to foot.
One edge 16 to the inch.

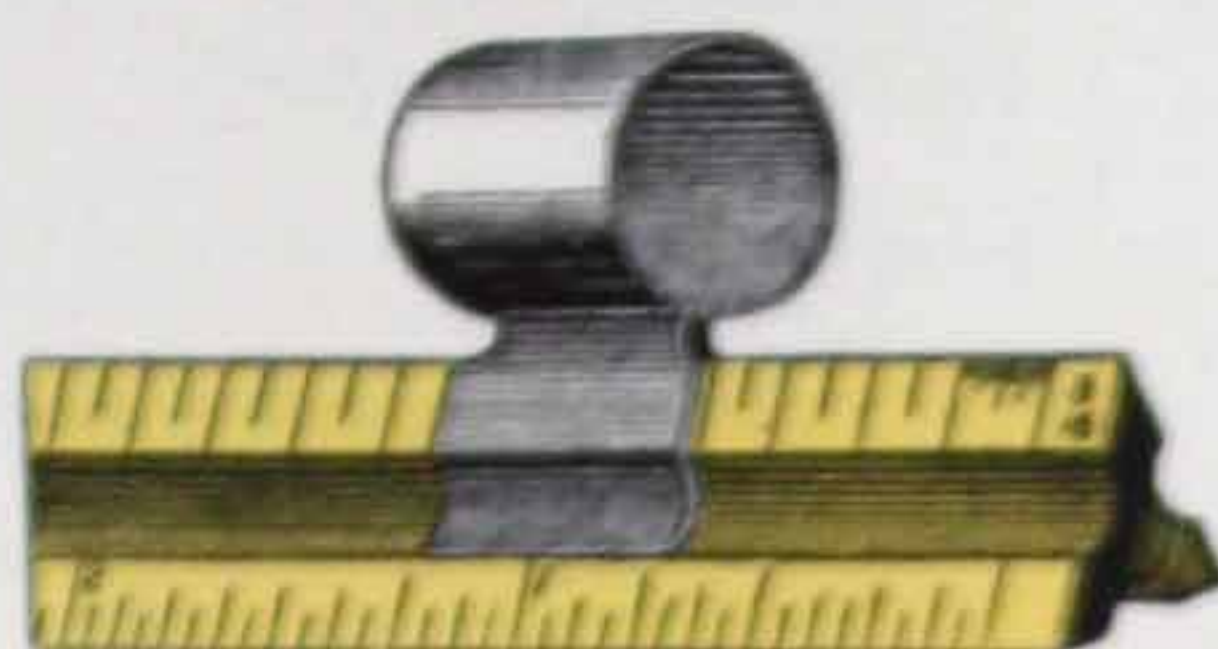
No. 2327.	12 in.....	SEDUM
-----------	------------	--------------

Graduated $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, 1, $1\frac{1}{2}$, 3 inches to the foot. One edge 50 parts to the inch
and one edge 16 to the inch.

No. 2332D.	12 in.....	Code Word SEEDER
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SEE PRICE LIST IN BACK OF CATALOG

SCALE GUARDS



No. 2370

- | | | |
|-----------|---|---------------------------|
| No. 2370. | Metal Guards for Triangular Scales..... | Code Word
SEMEN |
|-----------|---|---------------------------|

SHEATHS FOR TRIANGULAR SCALES

Made of heavy cardboard.

- | | | | | | |
|-----------|--------------------------------|---|----|----|----|
| | Length of Scale, inches— | 6 | 12 | 18 | 24 |
| No. 2371. | For Regular Shape Scales..... | | | | |
| No. 2372. | For Improved Shape Scales..... | | | | |

METRIC SCALES

TRIANGULAR BOXWOOD, REGULAR SHAPE

- | | | |
|-----------|--|---------------------------|
| No. 2380. | 20 cm. long, div. .01, .02, .03, .05, .025, .0125..... | Code Word
SERAI |
| No. 2381. | 30 cm. long, div. .01, .02, .03, .05, .025, .0125..... | SERAPE |

TRIANGULAR WHITE-EDGE, REGULAR SHAPE

Boxwood with white Celluloid Edges*.

- | | | |
|-----------|--|---------------|
| No. 2386. | 30 cm. long, div. .01, .02, .03, .05, .025, .0125..... | SEREIN |
|-----------|--|---------------|

FLAT BOXWOOD METRIC SCALES

- | | | |
|-----------|--|-----------------|
| No. 2390. | 10 cm. long, div. mm. and half mm..... | SERENE |
| No. 2391. | 20 cm. long, div. mm. and half mm..... | SERENITY |
| No. 2392. | 30 cm. long, div. mm. and half mm..... | SERF |
| No. 2393. | 50 cm. long, div. mm. and half mm..... | SERFAGE |

FLAT WHITE-EDGE METRIC SCALES

Boxwood with white Celluloid Edges*.

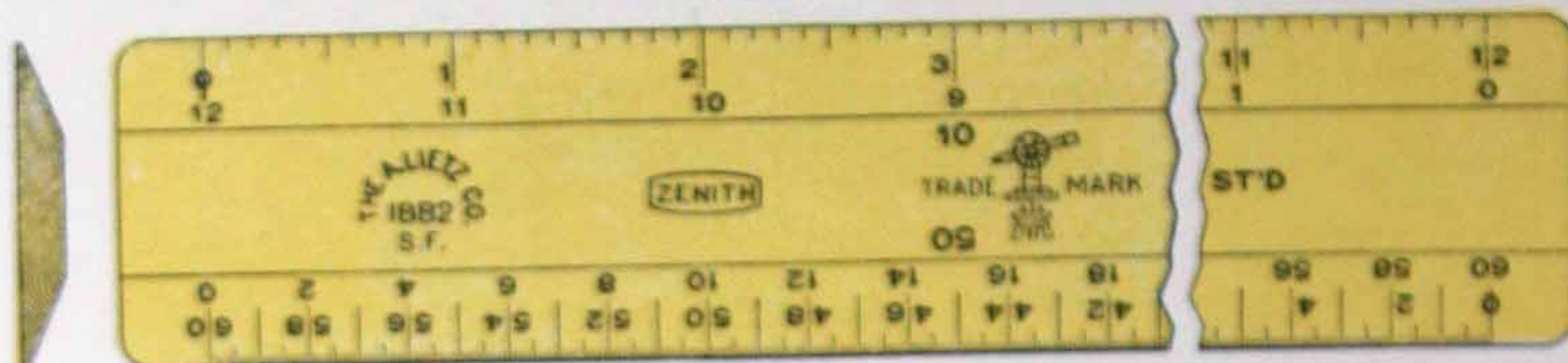
- | | | |
|-----------|--|-----------------|
| No. 2395. | 10 cm. long, div. mm. and half mm..... | SERGE |
| No. 2396. | 20 cm. long, div. mm. and half mm..... | SERGEANT |
| No. 2397. | 30 cm. long, div. mm. and half mm..... | SERIATIM |
| No. 2398. | 50 cm. long, div. mm. and half mm..... | SERIO |

*Lietz Cel-O-Met Metric Scales will be furnished if desired. Add letter "M" to catalog number. For description see page 304.

SEE PRICE LIST IN BACK OF CATALOG

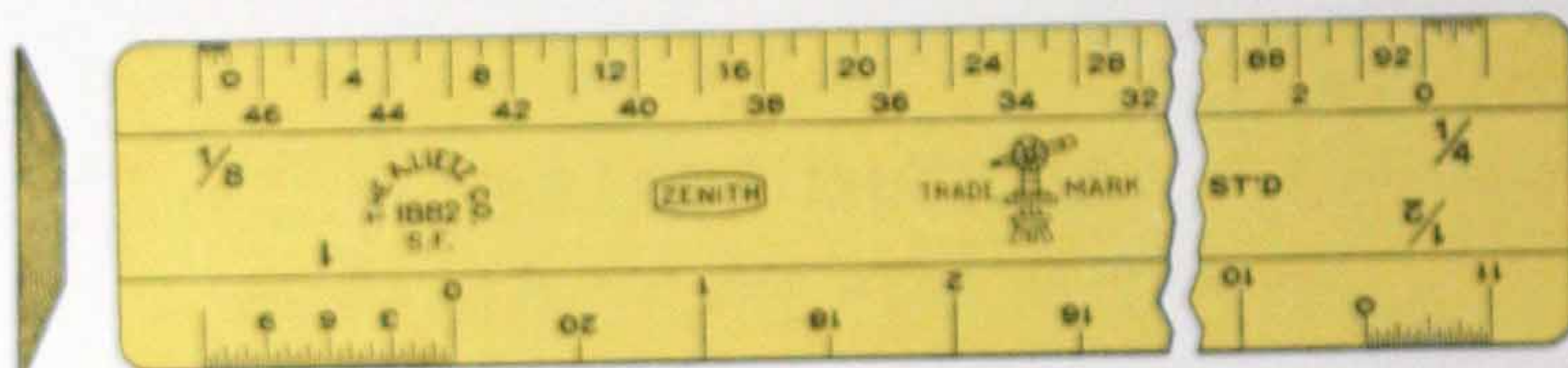
FLAT BOXWOOD SCALES

Machine Divided
REGULAR SHAPE



Divided inches and 10ths.

			Code Word
No. 2410—6 in.	10x50	parts to inch.	SESAME
No. 2412—6 in.	20x40	parts to inch.	SESQUI
No. 2413—6 in.	30x60	parts to inch.	SESSILE
No. 2415—12 in.	10x50	parts to inch.	SESTERCE
No. 2417—12 in.	20x40	parts to inch.	SETET
No. 2418—12 in.	30x60	parts to inch.	SETTEE



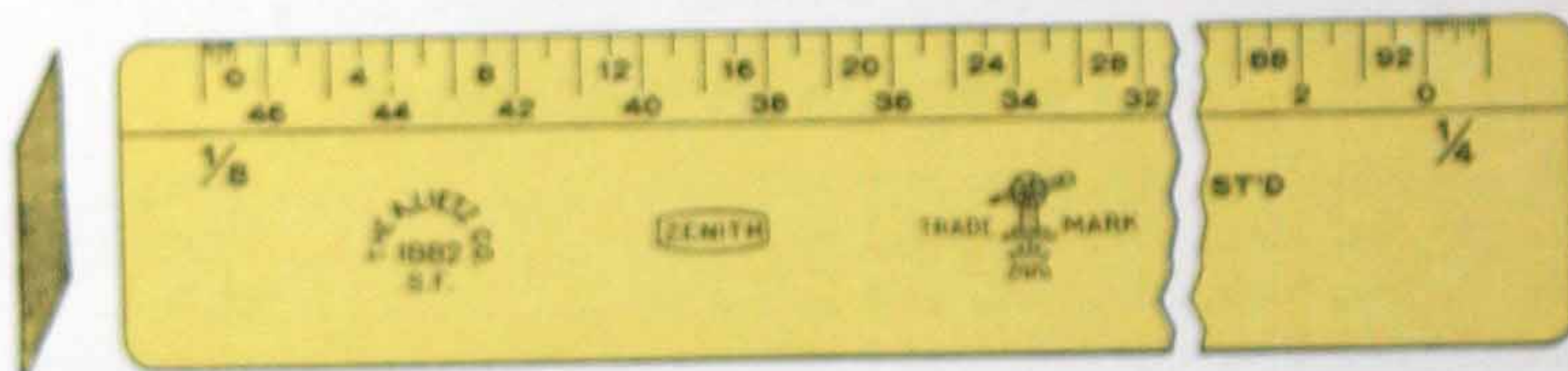
Graduated $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$ and 1 inch to the foot.

No. 2440—6 in.	SETTER
No. 2441—12 in.	SETTING

Graduated $\frac{3}{8}$, $\frac{5}{4}$, $1\frac{1}{2}$ and 3 inches to foot.

No. 2447—12 in.	SETTLER
-----------------	---------

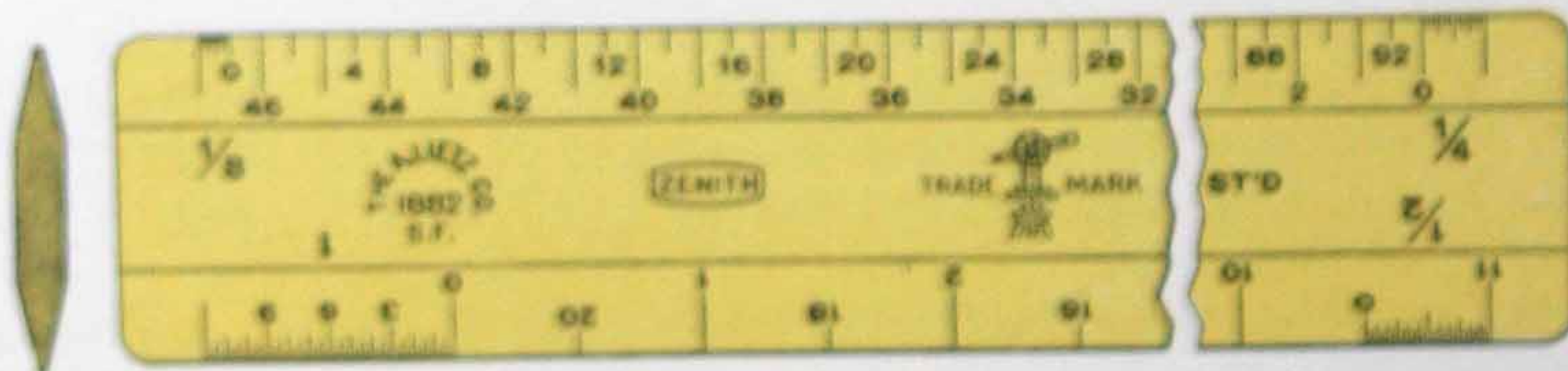
OPPOSITE BEVEL SHAPE



Graduated $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$ and 1 inch to the foot.

No. 2451—12 in.	SETTO
-----------------	-------

DOUBLE BEVEL SHAPE



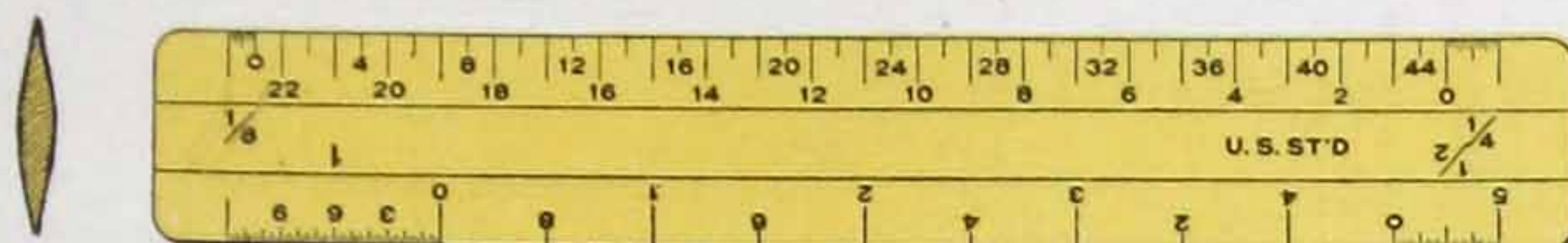
Graduated $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, $1\frac{3}{8}$, $\frac{5}{4}$, $1\frac{1}{2}$ and 3 inches to the foot.

No. 2461—12 in.	SETTY
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SEE PRICE LIST IN BACK OF CATALOG

FLAT BOXWOOD SCALES

Machine Divided

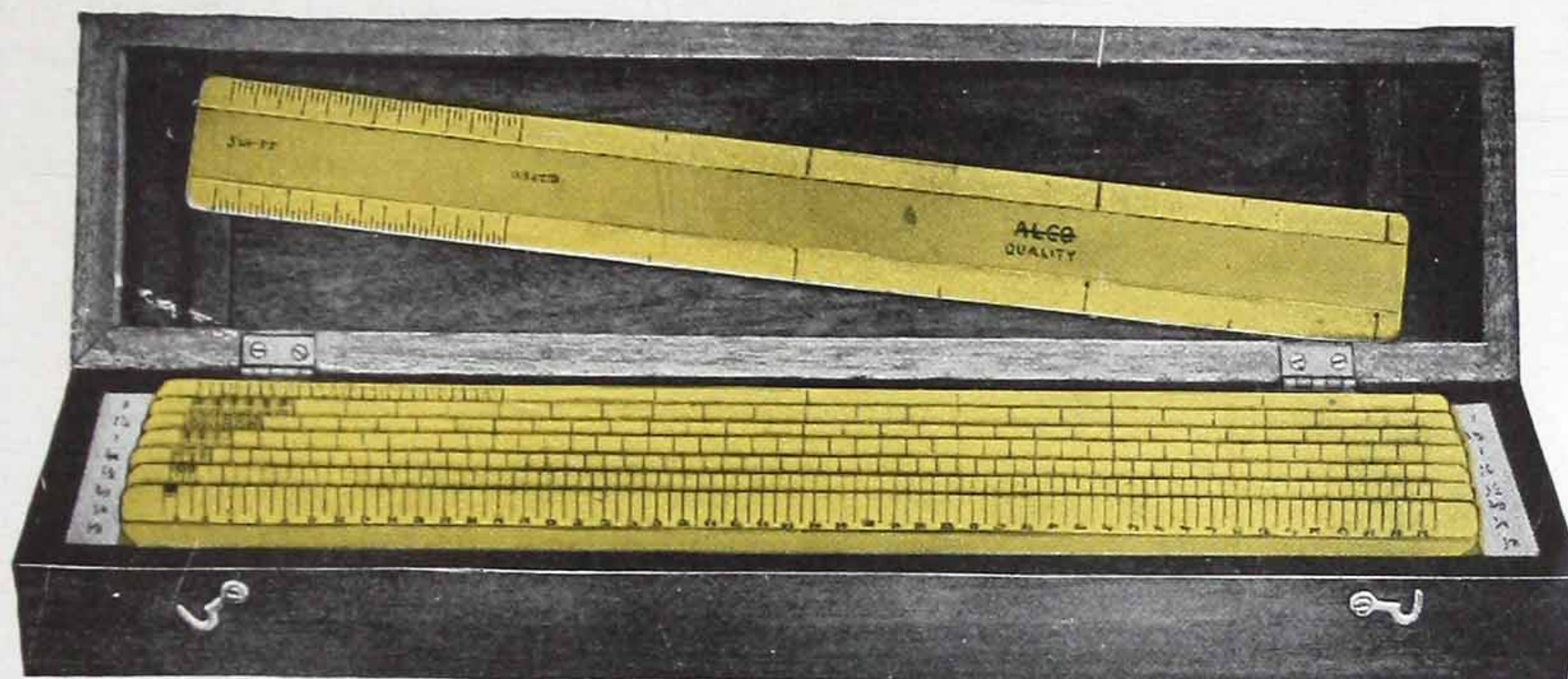


In Leather Sheath, $\frac{3}{4}$ in. wide.

No. 2480. 6 in., divided 10, 40, 30 and 50 parts to inch..... **SEXTAIN**

No. 2481. 6 in., divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1, $\frac{3}{8}$, $\frac{3}{4}$, $1\frac{1}{2}$ and 3 inches to the foot..... **SEXTILE**

MAHOGANY CASES FOR 12-INCH SCALES



Partitioned mahogany cases for scales, finely finished.

Number	2485A	2485B	2485C	2485D	2485E
Capacity	4 scales	6 scales	8 scales	10 scales	12 scales
Code Word	SEXTIN	SEXTION	SEXTIP	SEXTIRA	SEXTISH

FLAT STEEL SCALE RULES



No. 2487. 12-in., one edge beveled. Approximate thickness $\frac{3}{64}$ in., graduated 16ths, 32nds, 64ths and 100ths. (100ths on beveled edge)..... **SEXTILLION**



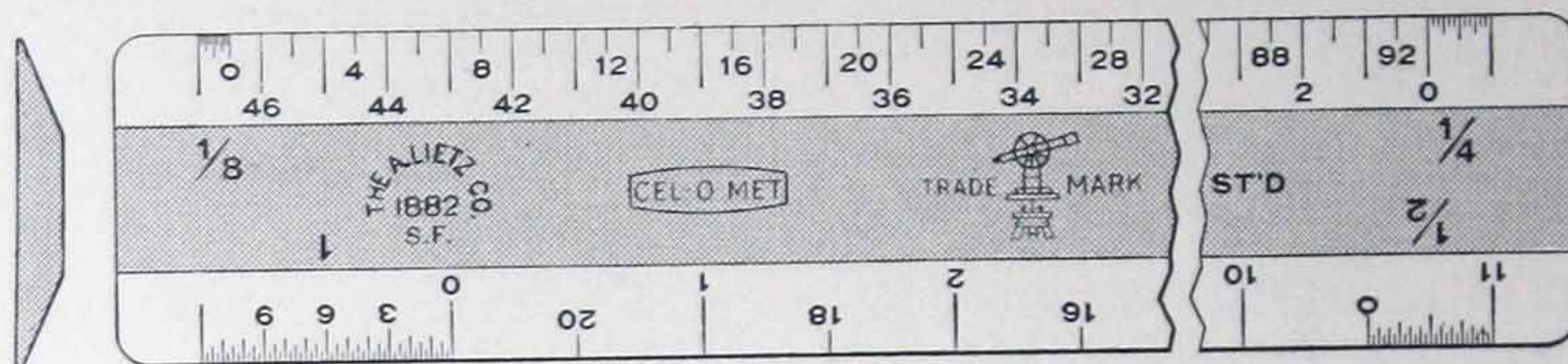
No. 2488. 12 in., not beveled; marked both sides. One side, upper edge, 16ths, 32nds, 64ths; lower edge 10ths, 20ths, 50ths and 100ths inches; other side, upper edge millimeters, lower edge half-millimeters..... **SEXTO**

SEE PRICE LIST IN BACK OF CATALOG

LIETZ CEL-O-MET WHITE-EDGE SCALES

Trade Mark.

Patent applied for.



Dural Metal Body. White Celluloid Edges

Lietz CEL-O-MET Draftsmen's Scales are the result of many years experimental work by our research department. They represent a distinct improvement over box-wood scales. Lietz CEL-O-MET Scales have a body constructed of dural metal, with recessed beveled edges to which white celluloid strips are permanently attached. Lietz CEL-O-MET Scales therefore are not affected by moisture and other climatic changes.

Lietz CEL-O-MET Scales combine three of the most desirable features of a scale in one; namely, **Permanency, Accuracy and Visibility.**

PERMANENCY—The metal body of Lietz CEL-O-MET Scales will retain its shape and will not bend, twist or change in length. It will withstand rough usage and climatic conditions will not affect it. The white celluloid edges are permanently attached by a special method evolved in the Lietz laboratory.

ACCURACY—The main body of Lietz CEL-O-MET Scales being of metal, the graduations maintain a permanent accuracy.

VISIBILITY—The perfect contrast between the black figures and graduations and the white background of the celluloid offers perfect visibility and easy reading. It reduces eyestrain and eliminates all glare which is so common on other types of metal scales where the graduations are made directly on the metal.

Other advantages—The under bearing surface of Lietz CEL-O-MET Scales is slightly concave. Consequently, contact with the paper is only along the edges of the scale, reducing area of contact and resulting friction. This feature overcomes smudging of the paper so common with scales having flat bottoms. The celluloid edge assures the draftsman that the pencil lead will not be cut if he uses the edge of the scale for drawing or marking.

Finish—Lietz CEL-O-MET Scales are attractively finished. The metal center has a satin silver finish; the edges are pure white and the graduations are clear, distinct, permanent and accurate.

TRIANGULAR WHITE-EDGE SCALES

BOXWOOD

CEL-O-MET

Trade Mark



Regular shape

Improved shape

Our Triangular White Edge Scales are Machine divided to U. S. Standard Measurements. Made in **Regular** and **Improved** shapes, fully described on page 299.



ENGINEERS' WHITE-EDGE SCALES

Graduated 10, 20, 30, 40, 50, 60 parts to the inch.

No. 2341.	6 inch, REGULAR SHAPE, Boxwood.....	Code Word
No. 2341 X.	6 inch, IMPROVED SHAPE, Boxwood.....	SELAH
No. 2341M.	6 inch, IMPROVED SHAPE, CEL-O-MET Scale.....	SENNNA
No. 2342.	12 inch, REGULAR SHAPE, Boxwood.....	SENNOCE
No. 2342 X.	12 inch, IMPROVED SHAPE, Boxwood.....	SELDER
No. 2342M.	12 inch, IMPROVED SHAPE, CEL-O-MET Scale.....	SENNIT
No. 2344 X.	24 inch, IMPROVED SHAPE, Boxwood.....	SENNOTE
No. 2344M.	24 inch, IMPROVED SHAPE, CEL-O-MET Scale.....	SENNORITA
		SENNORMA

Graduated 20, 30, 40, 50, 60, 80 parts to the inch.

No. 2347 X.	12 inch, IMPROVED SHAPE, Boxwood.....	SENSATE
No. 2347M.	12 inch, IMPROVED SHAPE, CEL-O-MET Scale.....	SENSAW

Graduated 100, 200, 300, 400, 500, 600 parts to the foot.

No. 2352 X.	12 inch, IMPROVED SHAPE, Boxwood.....	SENSILE
No. 2352M.	12 inch, IMPROVED SHAPE, CEL-O-MET Scale.....	SENSIST



ARCHITECTS' WHITE-EDGE SCALES

Graduated $\frac{3}{32}$, $\frac{3}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1, $1\frac{1}{2}$ and 3 inches to foot.
One edge 16 to the inch.

No. 2361.	6 inch, REGULAR SHAPE, Boxwood.....	Code Word
No. 2361 X.	6 inch, IMPROVED SHAPE, Boxwood.....	SELENIUM
No. 2361M.	6 inch, IMPROVED SHAPE, CEL-O-MET Scale.....	SENSOR
No. 2362.	12 inch, REGULAR SHAPE, Boxwood.....	SENSOTE
No. 2362 X.	12 inch, IMPROVED SHAPE, Boxwood.....	SELTZER
No. 2362M.	12 inch, IMPROVED SHAPE, CEL-O-MET Scale.....	SENTIENT
No. 2364 X.	24 inch, IMPROVED SHAPE, Boxwood.....	SENTOR
No. 2364M.	24 inch, IMPROVED SHAPE, CEL-O-MET Scale.....	SENTRY
		SENTWIT

Graduated $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1, $\frac{3}{4}$, $1\frac{1}{4}$, $1\frac{1}{2}$, 2, 3 and 4 inches to foot.
One edge 16 to the inch.

No. 2367.	12 inch, REGULAR SHAPE, Boxwood.....	SELVAGE
No. 2367 X.	12 inch, IMPROVED SHAPE, Boxwood.....	SENTYRE
No. 2367M.	12 inch, IMPROVED SHAPE, CEL-O-MET Scale.....	SENWICK
No. 2369 X.	24 inch, IMPROVED SHAPE, Boxwood.....	SEPOY
No. 2369M.	24 inch, IMPROVED SHAPE, CEL-O-MET Scale.....	SEPOZE

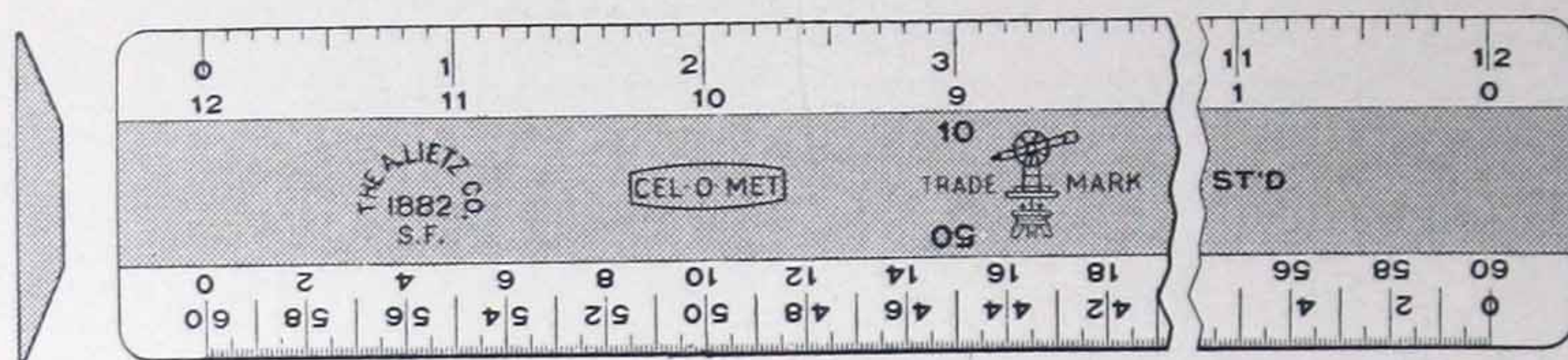
SEE PRICE LIST IN BACK OF CATALOG

CEL-O-MET FLAT WHITE-EDGE SCALES

Trade Mark.

Patent applied for.

REGULAR SHAPE, MACHINE DIVIDED



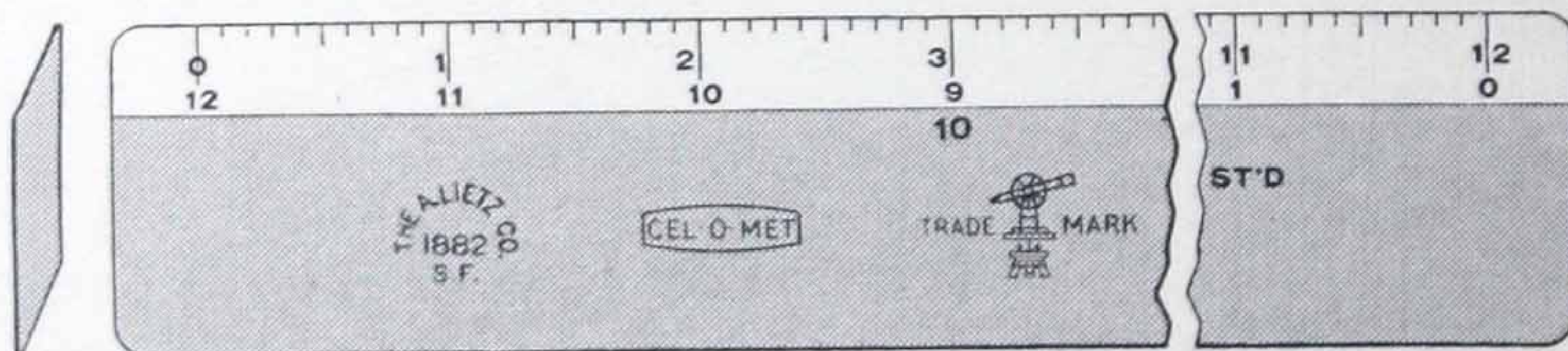
Divided inches and 10ths.

				Code Word
No. 2510M.	6 in.....	10x50	parts to inch.....	SHABER
No. 2512M.	6 in.....	20x40	parts to inch.....	SHABILL
No. 2513M.	6 in.....	30x60	parts to inch.....	SHACK
No. 2514M.	6 in.....	80x100	parts to inch.....	SHACKLE
No. 2515M.	12 in.....	10x50	parts to inch.....	SHAD
No. 2517M.	12 in.....	20x40	parts to inch.....	SHADER
No. 2518M.	12 in.....	30x60	parts to inch.....	SHADOW
No. 2519M.	12 in.....	80x100	parts to inch.....	SHADY

Divided feet in 100ths. (Made to order only.)

No. 2520M.	12 in.....	100x500	parts to foot.....	SHAFTER
No. 2521M.	12 in.....	200x400	parts to foot.....	SHAFTING
No. 2522M.	12 in.....	300x600	parts to foot.....	SHAG
No. 2523M.	12 in.....	800x1000	parts to foot.....	SHAGGY

OPPOSITE BEVEL SHAPE (Made to order only)



Divided inches and 10ths.

				Code Word
No. 2530M.	12 in.....	10x50	parts to inch.....	SHAGREEN
No. 2531M.	12 in.....	20x40	parts to inch.....	SHAH
No. 2532M.	12 in.....	30x60	parts to inch.....	SHAKER
No. 2533M.	12 in.....	80x100	parts to inch.....	SHAKO

BOXWOOD SCALES WITH WHITE EDGES can be furnished if so specified.
Substitute letter "B" for "M" after catalog number.

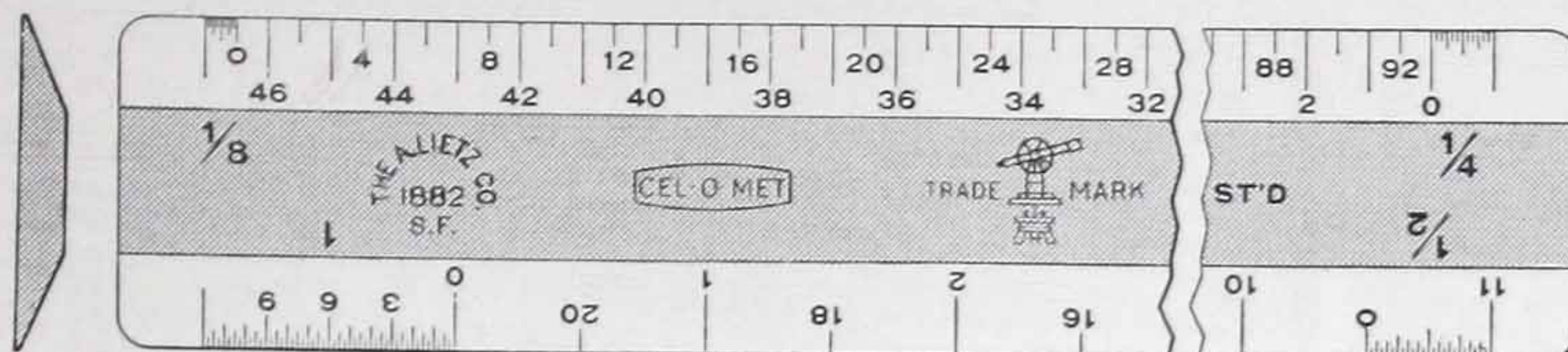
SEE PRICE LIST IN BACK OF CATALOG

CEL-O-MET FLAT WHITE-EDGE SCALES

Trade Mark.

Patent applied for.

REGULAR SHAPE, MACHINE DIVIDED



The same divisions on BOTH EDGES, one edge reading from left to right, the other edge from right to left.

- | | | |
|------------|--|---------------------------|
| No. 2535M. | 12 in. graduated $\frac{1}{8}$ in. to the foot..... | Code Word
SHALE |
| No. 2536M. | 12 in., graduated $\frac{1}{4}$ in. to the foot..... | SHALLOON |
| No. 2537M. | 12 in., graduated $\frac{1}{2}$ in. to the foot..... | SHALLOP |

Graduated $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, and 1 inch to the foot.

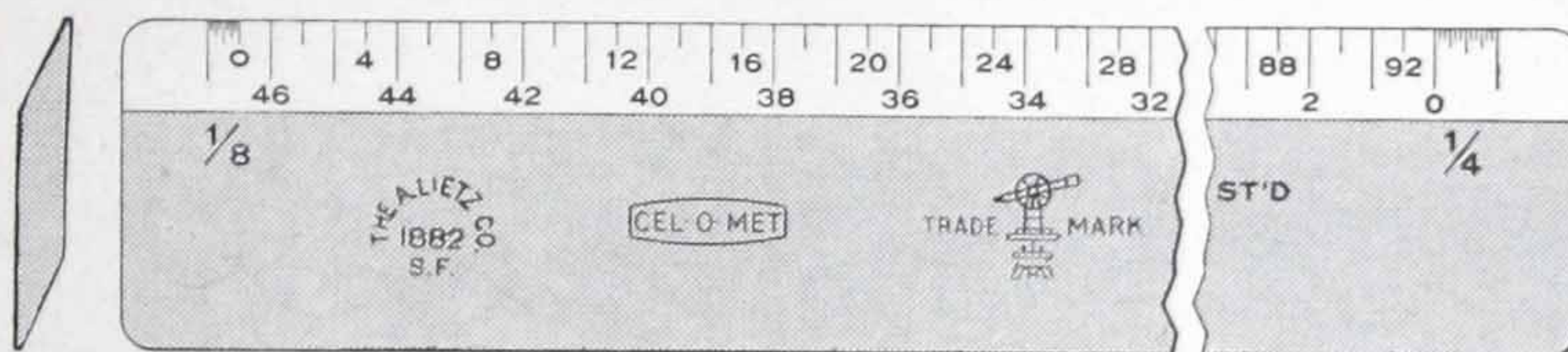
No. 2542M reads 100 feet on $\frac{1}{8}$, 50 feet on $\frac{1}{4}$ and 25 feet on $\frac{1}{2}$ inch.

- | | | |
|------------|--------------------------|----------------|
| No. 2540M. | 6 in..... | SHAM |
| No. 2541M. | 12 in..... | SHAMBLE |
| No. 2542M. | 12 $\frac{1}{2}$ in..... | SHAMMER |
| No. 2544M. | 24 in..... | SHAMMY |

Graduated $\frac{3}{8}$, $\frac{3}{4}$, $1\frac{1}{2}$ and 3 inches to the foot.

- | | | |
|------------|------------|-----------------|
| No. 2546M. | 6 in..... | SHAMROCK |
| No. 2547M. | 12 in..... | SHANKY |
| No. 2549M. | 24 in..... | SHARD |

OPPOSITE BEVEL SHAPE

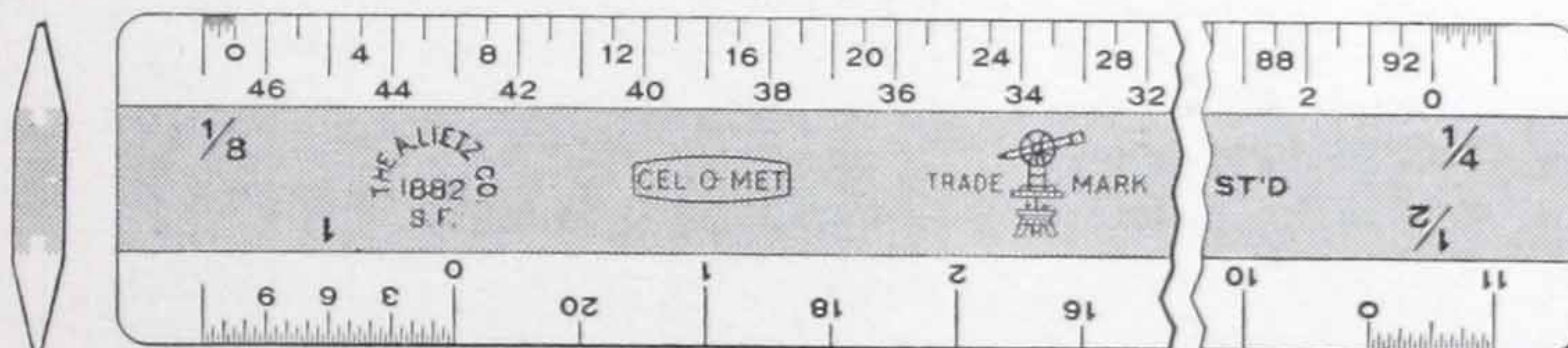


Graduated $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, and 1 inch to the foot.

Code Word

- | | | |
|------------|------------|----------------|
| No. 2551M. | 12 in..... | SHARPER |
|------------|------------|----------------|

DOUBLE BEVEL SHAPE



Graduated $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1, $\frac{3}{8}$, $\frac{3}{4}$, $1\frac{1}{2}$ and 3 inches to the foot.

Code Word

- | | | |
|------------|------------|----------------|
| No. 2561M. | 12 in..... | SHATTER |
| No. 2563M. | 24 in..... | SHAVER |

BOXWOOD SCALES WITH WHITE EDGES can be furnished if so specified.
Substitute letter "B" for "M" after catalog number.

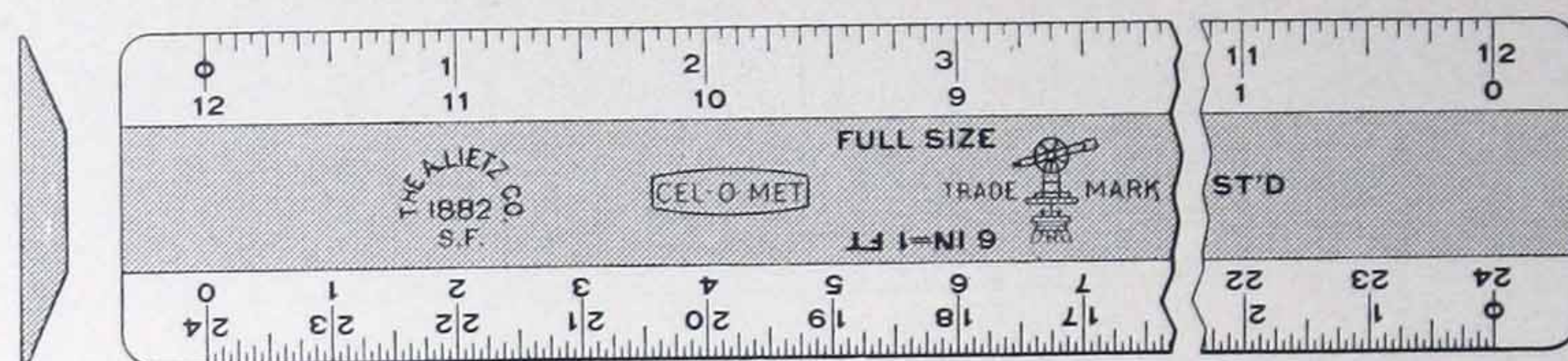
SEE PRICE LIST IN BACK OF CATALOG

CEL-O-MET FLAT WHITE-EDGE SCALES

Trade Mark

Patent applied for.

REGULAR SHAPE. MACHINE DIVIDED.



Graduated Full Size to 32nds and Half Size to 16ths

		Code Word
No. 2566M.	6 in.	SHEABA
No. 2567M.	12 in.	SHEABER
No. 2568M.	24 in.	SHEABOT

MISCELLANEOUS DIVISIONS

No. 2570M.	12 in.	10x12 parts to inch.	SHEAF
No. 2572M.	12 in.	12x16 parts to inch.	SHEAFER
No. 2573M.	12 in.	16x32 parts to inch.	SHEARY
No. 2574M.	12 in.	32x64 parts to inch.	SHEAVE
No. 2575M.	12 in.	330x660 parts to inch.	SHEAVING

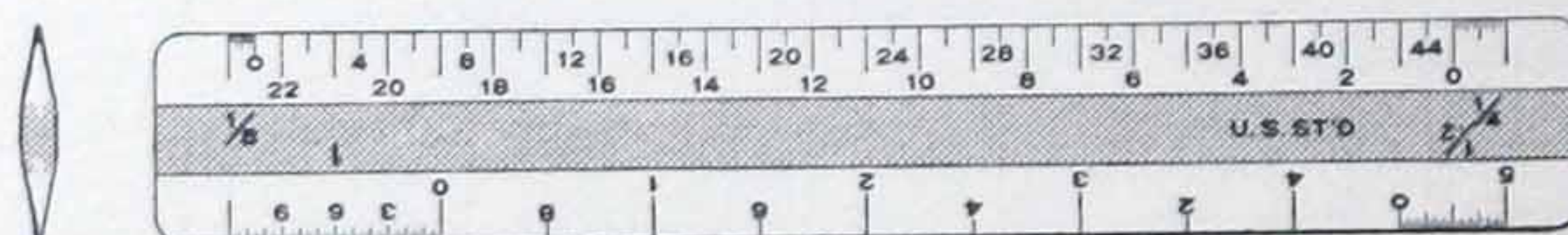
No. 2576M.	6 in., divided 16ths in. and millimeters.	SHEEN
No. 2577M.	12 in., divided 16ths in. and millimeters.	SHEKEL

Divided Inch to the Mile

No. 2578M.	12 in., divided 1 in. to mile x 2 in. to mile (Feet)	SHELDRAKE
No. 2579M.	12 in., divided 2 in. to mile x 4 in. to mile (Feet)	SHELTIE

FLAT WHITE-EDGE POCKET SCALE

Double Bevel Shape



In Leather Sheath, $\frac{3}{4}$ in. wide.

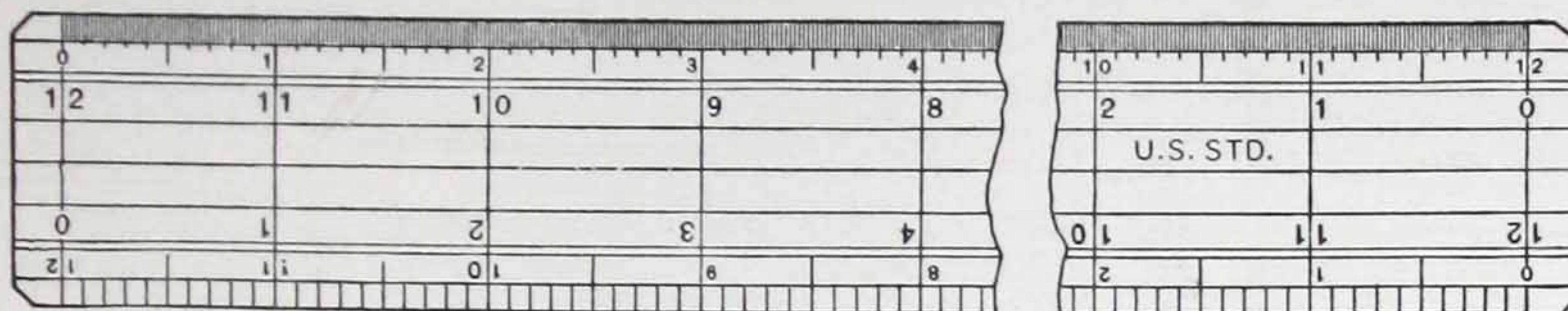
No. 2580M.	6 in., divided 10, 40, 30 and 50 parts to inch.	SHEOL
No. 2581M.	6 in., divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, $1\frac{3}{8}$, $\frac{3}{4}$, $1\frac{1}{2}$, 3 inches to the foot.	SHERBET

BOXWOOD SCALES WITH WHITE EDGES can be furnished if so specified.
Substitute letter "B" for "M" after catalog number.

SEE PRICE LIST IN BACK OF CATALOG

TRANSPARENT UNDERWRITERS' SCALES

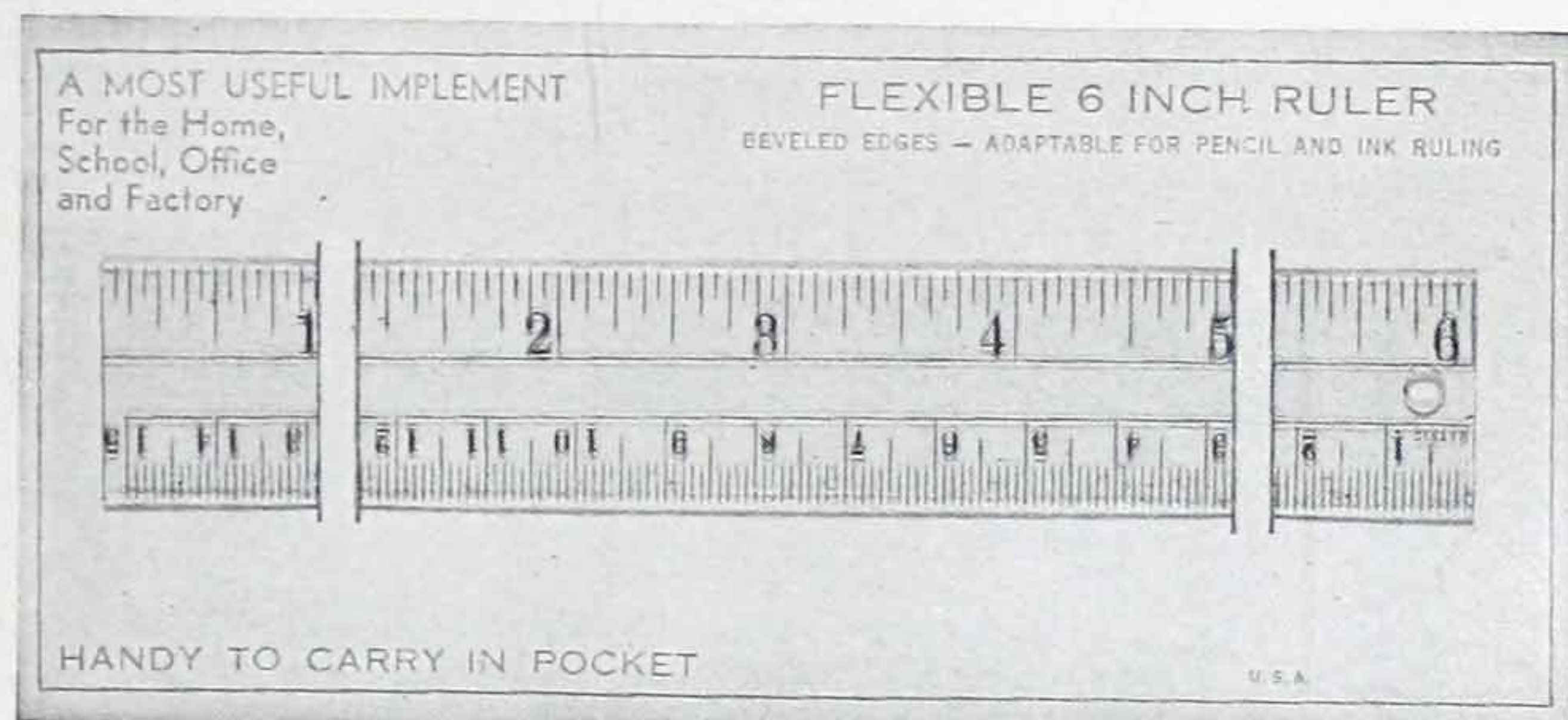
Regular Shape



Nos. 2663-2664

- | | | |
|-----------|---|-----------------------------|
| No. 2663. | Flat Transparent Amber Underwriters' Scale, 6 in.,
divided 10x50 parts to inch | Code Word
SHOCKER |
| No. 2664. | Same as No. 2663, but 12 in..... | SHORER |

TRANSPARENT FLEXIBLE RULERS



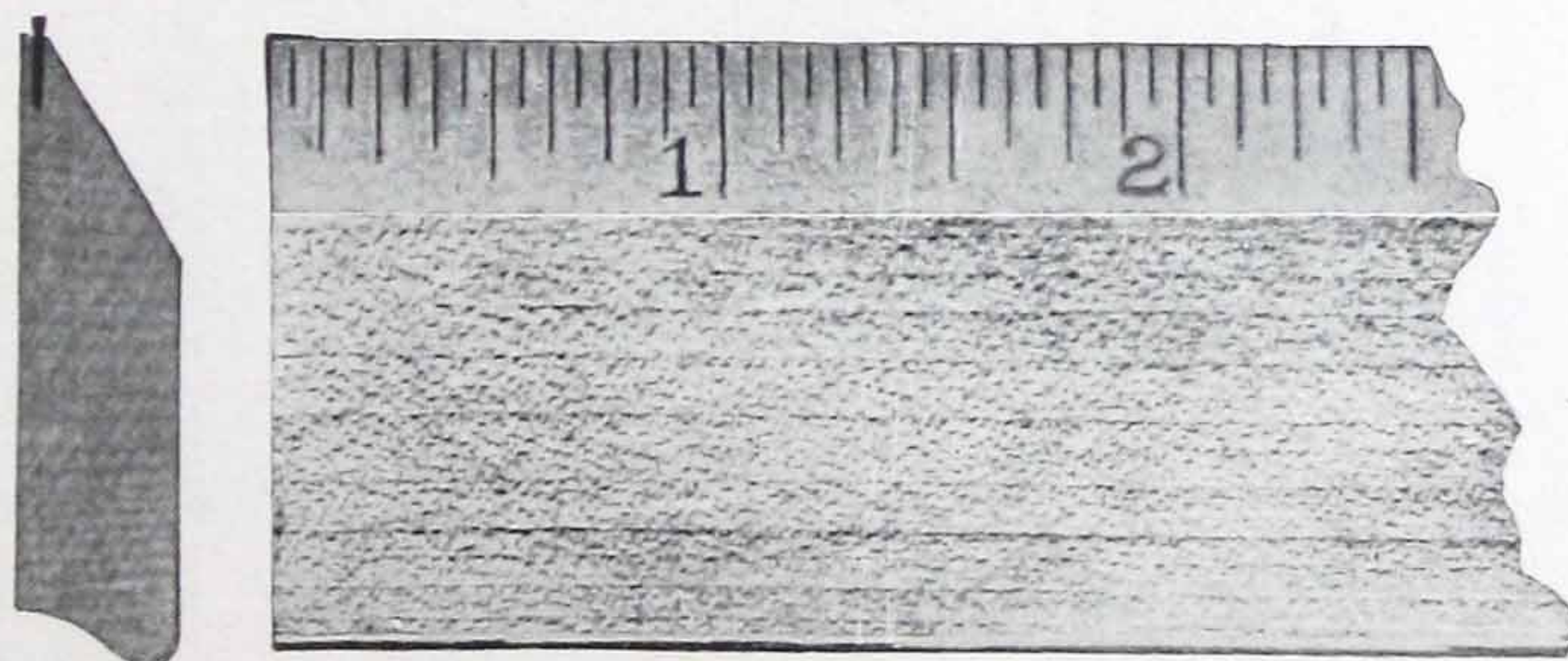
Nos. 2666-2667

Transparent flexible rulers are indispensable to the engineer, accountant and student. They are one inch wide and graduated one edge inches and sixteenths, the other edge centimeters and millimeters.

- | | | |
|-----------|--------------|----------------------------|
| No. 2666. | 6 inch..... | Code Word
SHOWIN |
| No. 2667. | 12 inch..... | SHOWMAN |

WOOD DESK RULERS

Made of Rock Maple in natural color, finely varnished.

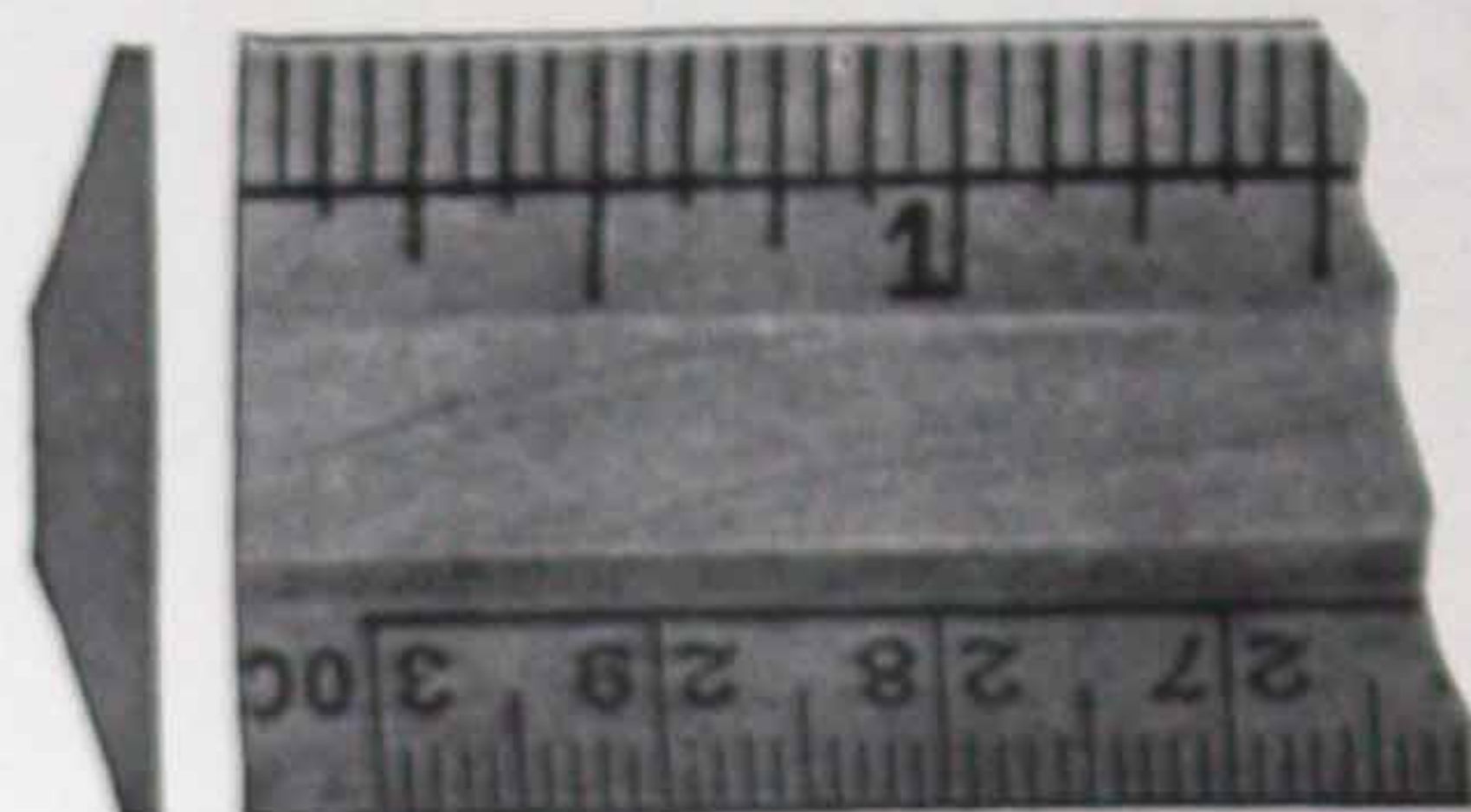


- | | | | | |
|-----------|--|---------------|---------------|--------|
| | Graduated inches and 16ths. | 12-in. | 15-in. | 18-in. |
| No. 2672. | Maple, inlaid brass edge...Code Word, SHREW | SHRIVE | SHROUD | |

SEE PRICE LIST IN BACK OF CATALOG

RULERS

Made of Rock Maple in natural color, varnished.

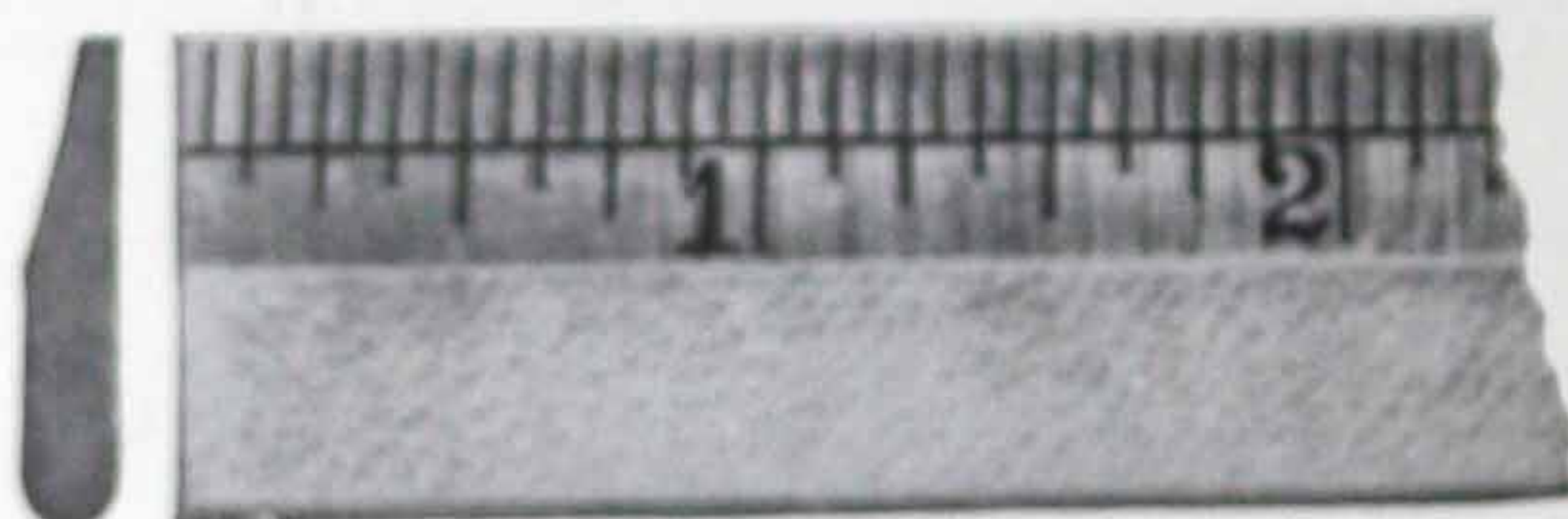


Protractor
on Back

Graduated inches and 16ths and metric.

Code Word

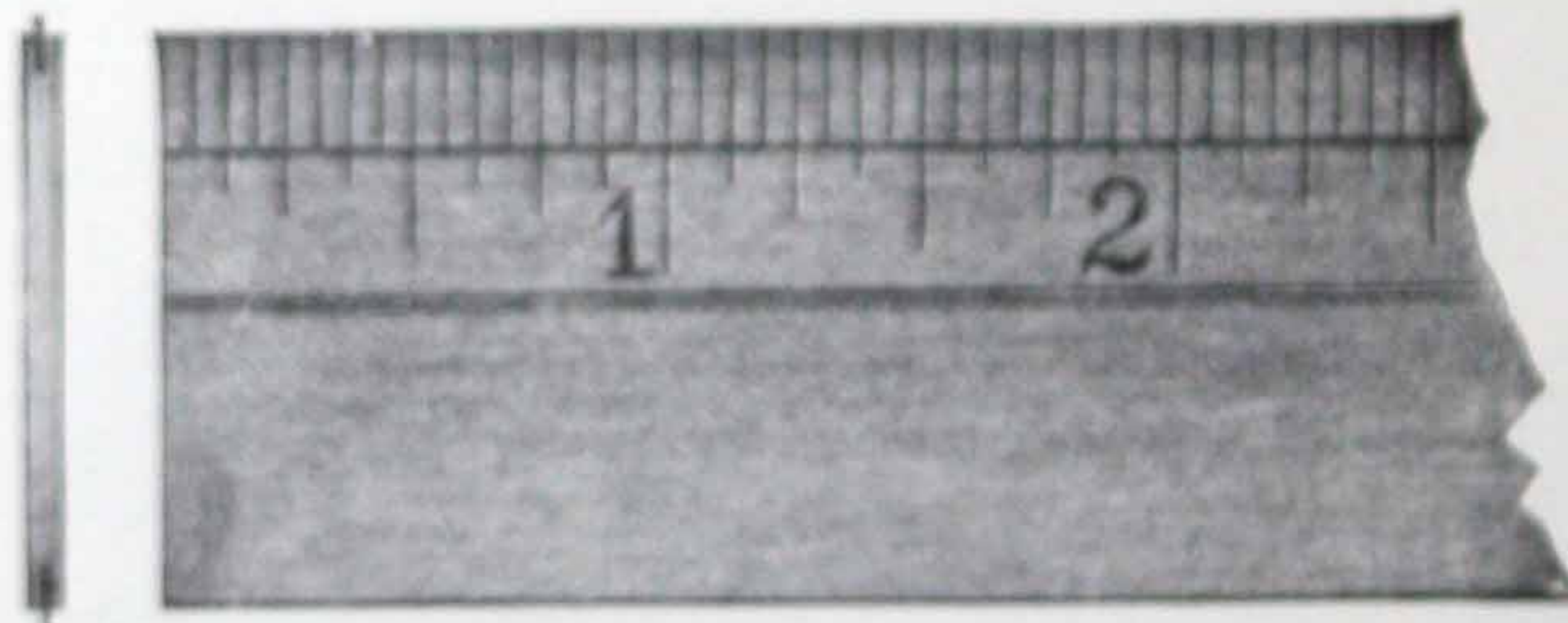
- No. 2673. Ruler, 12 inch, double bevel, plain edges, one bevel graduated inches and sixteenths and millimeters on the other. Protractor printed on reverse side, **SHRUB**
- No. 2673B. Same as No. 2673 with single brass edge, **SHRUBER**



Graduated inches and 16ths.

Code Word

- No. 2674. Ruler, 12 inch, plain edge, **SHUCK**
- No. 2674B. Same as No. 2674 with brass edge, **SHUCKET**



Graduated inches and sixteenths and metric.

Code Word

- No. 2675. Thin flexible ruler, 12 inch, single brass edge. Graduated inches and sixteenths on one side and millimeters on the other, **SHUFFLE**
- No. 2675½. Same as No. 2675 but 6 inches long, **SHULOM**

SEE PRICE LIST IN BACK OF CATALOG

YARD STICKS

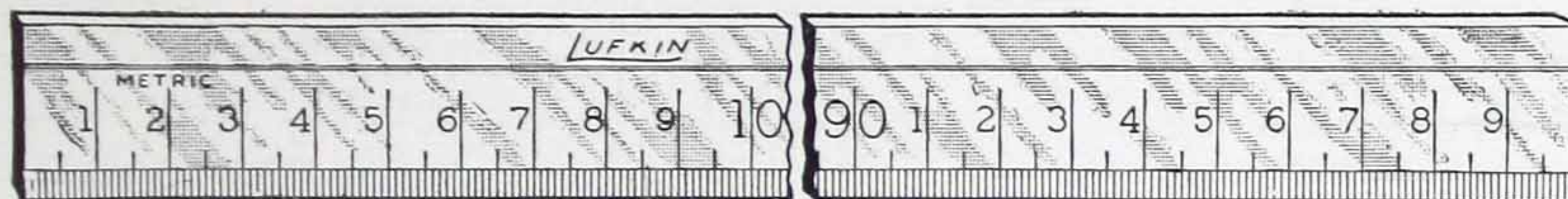


Nos. 2676-77

Graduated one side inches and 8ths, other side fractions of yards.

- | | | | |
|-----------|--|-----------|-----------|
| No. 2676. | Maple, polished, plain, 1x $\frac{1}{4}$ in. | Each..... | Code Word |
| No. 2677. | Maple, brass tipped, 1x $\frac{1}{4}$ in. | Each..... | SIAM |
| | | | SIAMESE |

METER STICKS

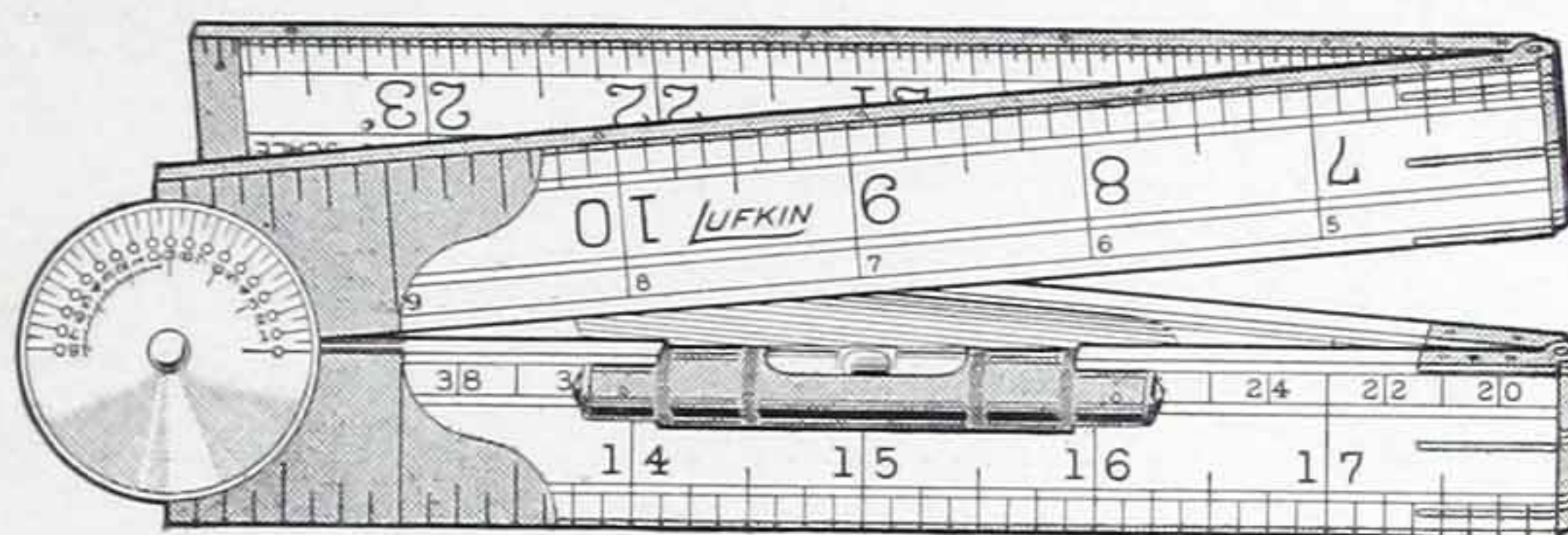


No. 2679

Graduated both sides, one edge only; one side inches and 8ths, other side to millimeters.

- | | | | |
|-----------|--|-----------|-----------|
| No. 2679. | Maple, polished, brass tipped, 1x $\frac{5}{16}$ in. | Each..... | Code Word |
| | | | SICE |

COMBINATION RULE, LEVEL AND PROTRACTOR

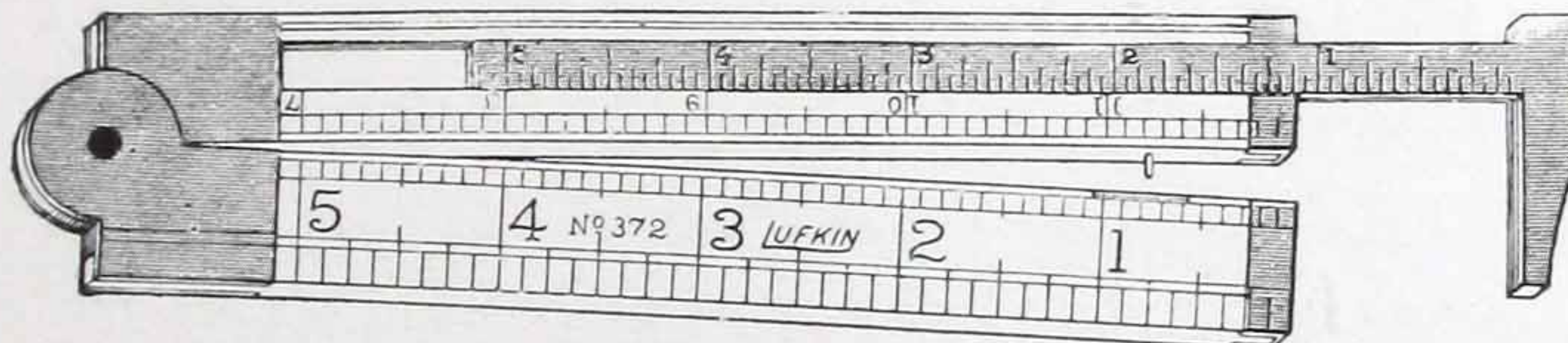


No. 2681

These rules have a spirit level and brass protractor plate. They serve many purposes and with the aid of the protractor, angles of any degree are readily measured or laid out. The level vial is mounted in a brass tube and well protected.

- | | | |
|-----------|---|-----------|
| No. 2681. | 2 ft., 4 fold, brass bound, marked 8ths and 16ths inch and drafting scales... | Code Word |
| | | SIDER |

BOXWOOD CALIPER RULES



No. 2686

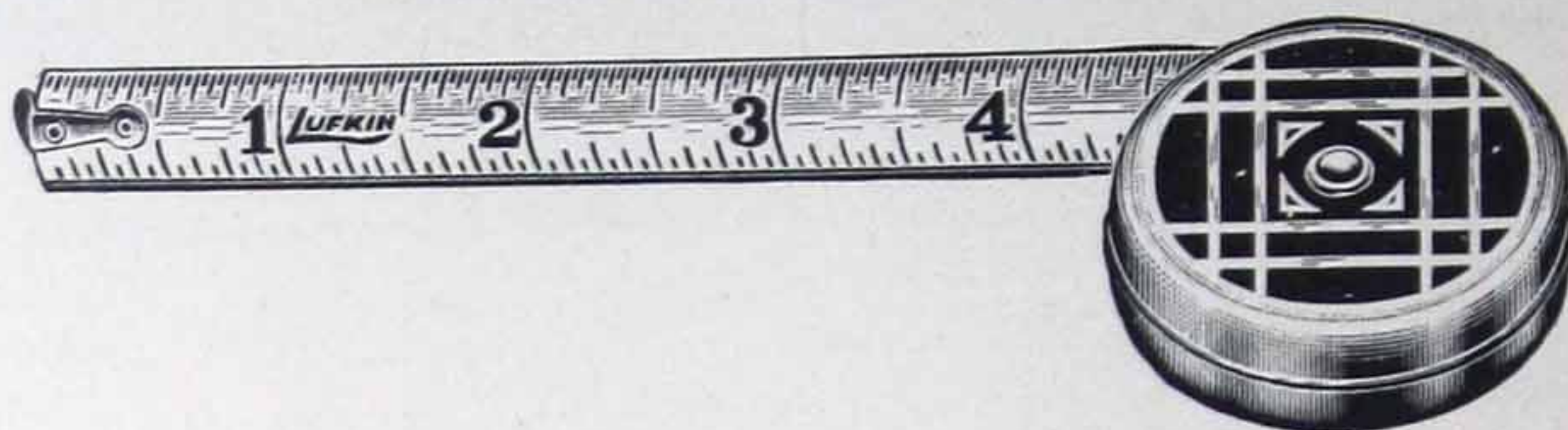
- | | | |
|-----------|--|-----------|
| No. 2685. | 6 in., 2 fold, unbound; graduated 8ths, 10ths 12ths and 16ths..... | Code Word |
| No. 2686. | 1 ft., 2 fold, unbound; graduated 8ths, 10ths, 12ths and 16ths..... | SIDING |
| No. 2687. | 2 ft., 4 fold, full bound; graduated 8ths, 10ths, 12ths and 16ths..... | SIDLE |
| | | SIESTA |

SEE PRICE LIST IN BACK OF CATALOG

FLEXIBLE STEEL TAPE RULES

Steel blades are stiffened by concave forming. Can be projected unsupported like a rule, yet will flex to accurately measure circles and odd shapes. Cases fully enclose the blade.

ARISTOCRAT TAPE RULES

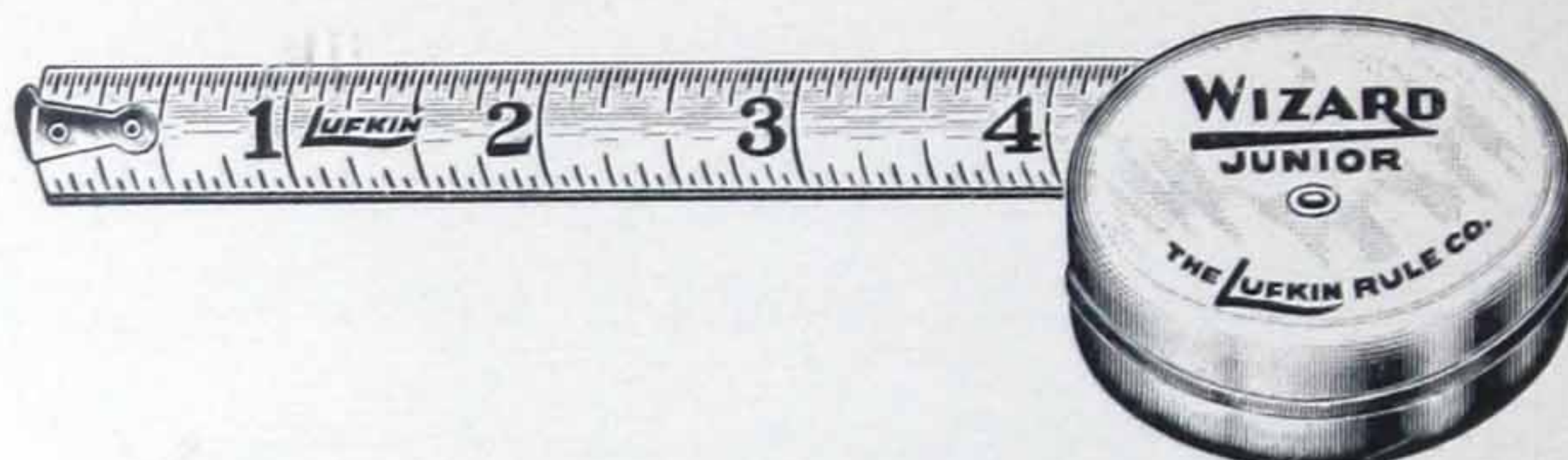


No. 2690

Code Word

- No. 2690.** 6 ft. Tape Rule, $\frac{7}{16}$ in. wide. Graduated inches to 16ths. First 6 inches upper edge to 32nds. Compact and very neat. Genuine stainless steel case. **SEFAD**
- No. 2690D.** Same as No. 2690. Graduated feet, 10ths and 100ths on upper edge and feet, inches and 16ths on lower edge. **SEFAST**

WIZARD JUNIOR TAPE RULES

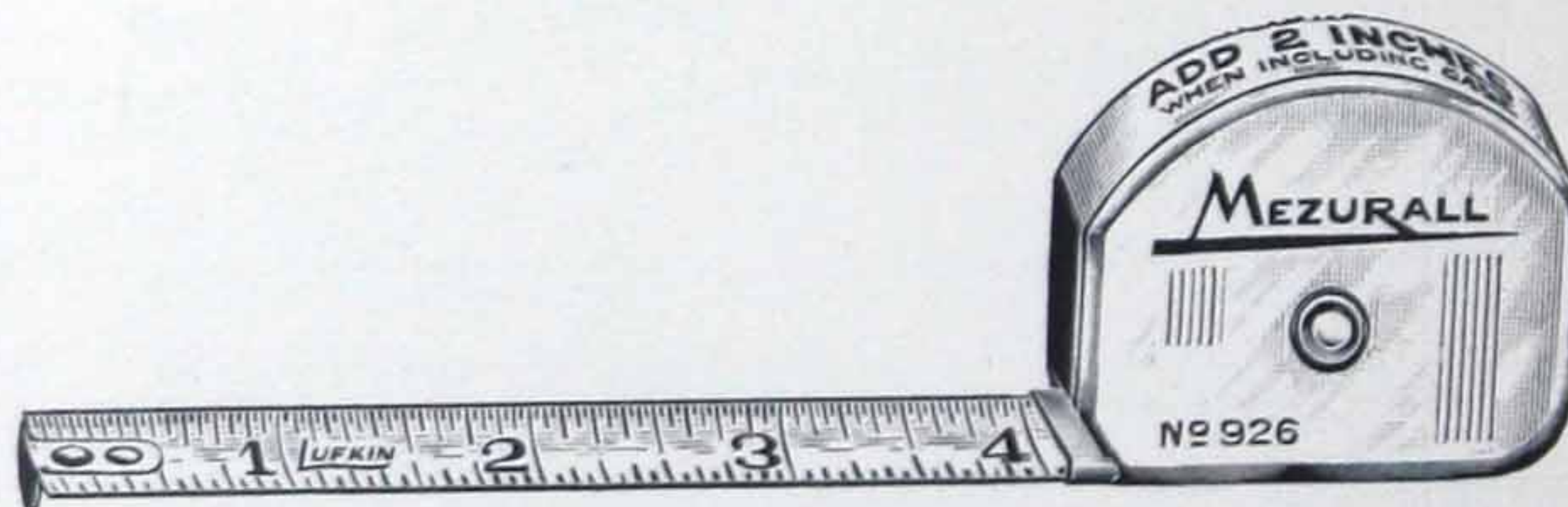


No. 2691

Code Word

- No. 2691.** 6 ft. Tape Rule, $\frac{1}{2}$ in. wide. Graduated inches to 16ths. First 6 inches upper edge to 32nds. Substantial nickel-plated case. **SIDAWN**

MEZURALL TAPE RULES



No. 2692

For inside and outside measurements.

Code Word

- No. 2692.** 6 ft. Mezurall Tape Rule, $\frac{1}{2}$ in. wide; graduated inches to 16ths. First 6 inches upper edge to 32nds. Nickel-plated case with square back; for inside and outside measurements, sliding end hook. **SIDEL**

The above Flexible Steel Tape Rules can be furnished graduated in millimeters on special order.

SEE PRICE LIST IN BACK OF CATALOG

FLEXIBLE STEEL TAPE RULES

CRESCENT STAINLESS STEEL TAPE RULES

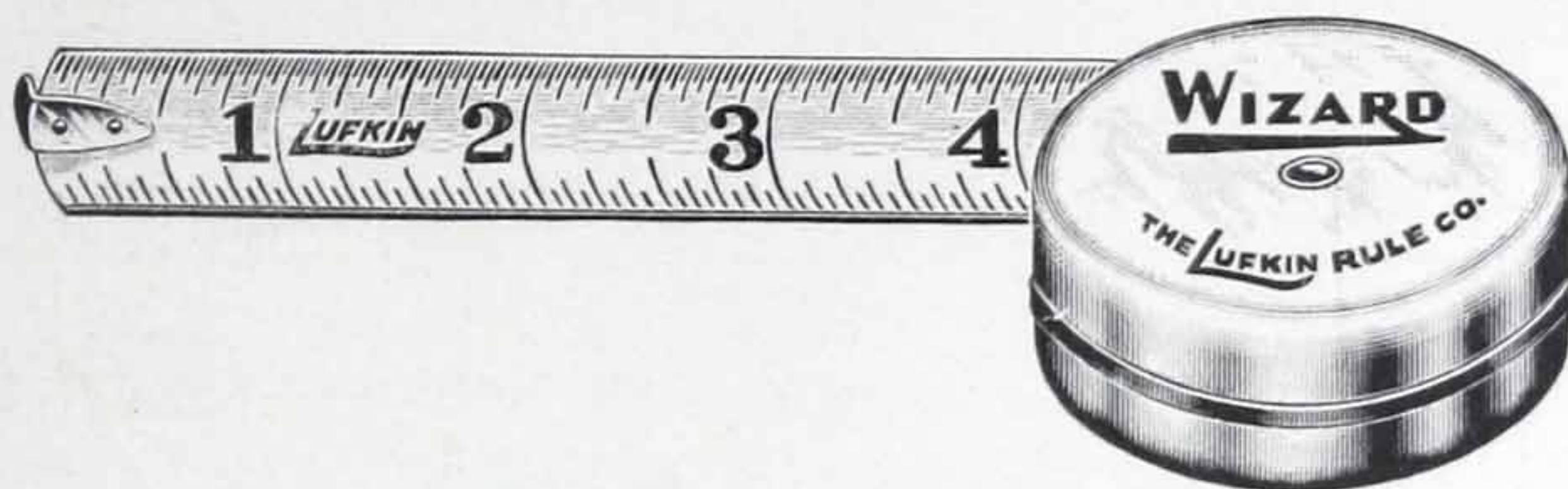


No. 2696

Code Word

- No. 2696.** 6 ft. Stainless Steel Tape Rule, $\frac{5}{8}$ in. wide; graduated inches to 16ths. First 6 inches upper edge to 32nds. Stainless steel case, spring winding action, sliding end hook. **SIELO**
- No. 2696D.** Same as No. 2696; graduated feet, 10ths and 100ths on upper edge and feet, inches and 16ths on lower edge. . **SIEMER**

WIZARD TAPE RULES



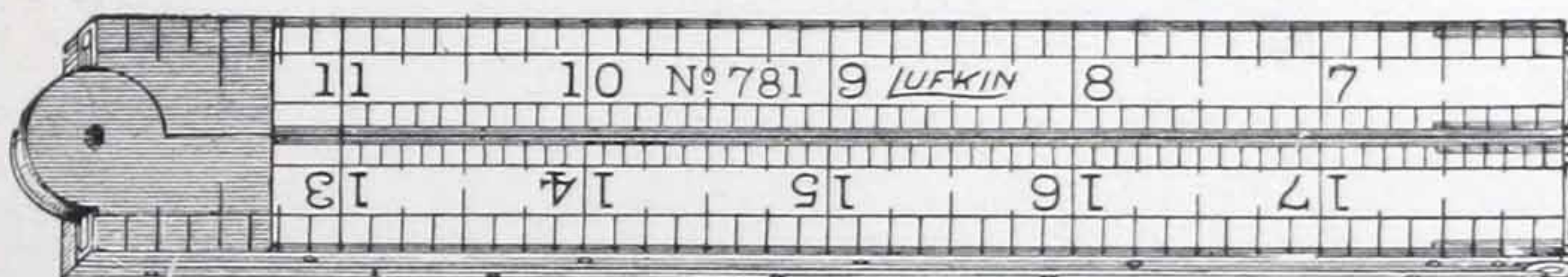
No. 2700

Code Word

- No. 2700.** 6 ft. Tape Rule, $\frac{5}{8}$ in. wide; graduated inches to 16ths. First 6 inches upper edge to 32nds. Nickel-plated case, manually operated. **SIEWIN**
- No. 2700D.** Same as No. 2700; graduated to feet, 10ths and 100ths of feet upper edge and feet, inches and 16ths on lower edge. **SIEWIRE**

The above Flexible Steel Tape Rules can be furnished graduated in millimeters on special order.

TWO-FOOT BOXWOOD RULES

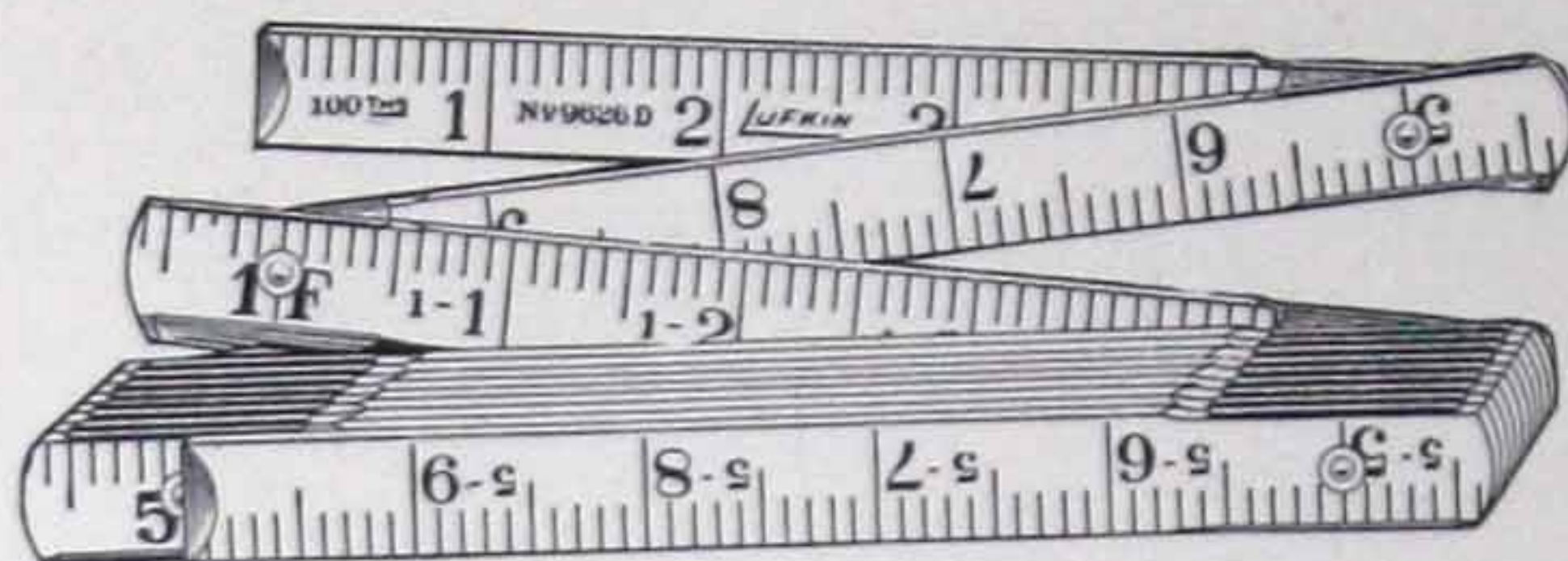


Code Word

- No. 2728.** 2 ft., 4 fold, 1 in. wide, full bound; graduated 8, 10, 12 and 16ths. Each. **SILO**
- No. 2728 $\frac{1}{2}$.** Same as No. 2728, graduated 10ths and 100ths of a foot, and 10ths and 16ths of inches. Each. **SILTY**

SEE PRICE LIST IN BACK OF CATALOG

HARDWOOD SPRING JOINT RULES



$\frac{5}{8}$ in. wide

These Pocket Rules are thin and light, and provided with spring joints so that they may be held in a straight line when open. They are made of strong material, and heavily coated, and the ends are provided with metal tips.

Yellow Enamel.

White Enamel.

Marked consecutive inches, divided in 16ths.

	Code Word		Code Word
No. 2734. 4 ft.....	SIMAD	No. 2734W. 4 ft.....	SIMAN
No. 2736. 6 ft.....	SIMAIL	No. 2736W. 6 ft.....	SIMAS

Marked feet and inches, divided in 16ths.

No. 2746. 6 ft.....	SIMER	No. 2746W. 6 ft.....	SIMEAL
---------------------	--------------	----------------------	---------------

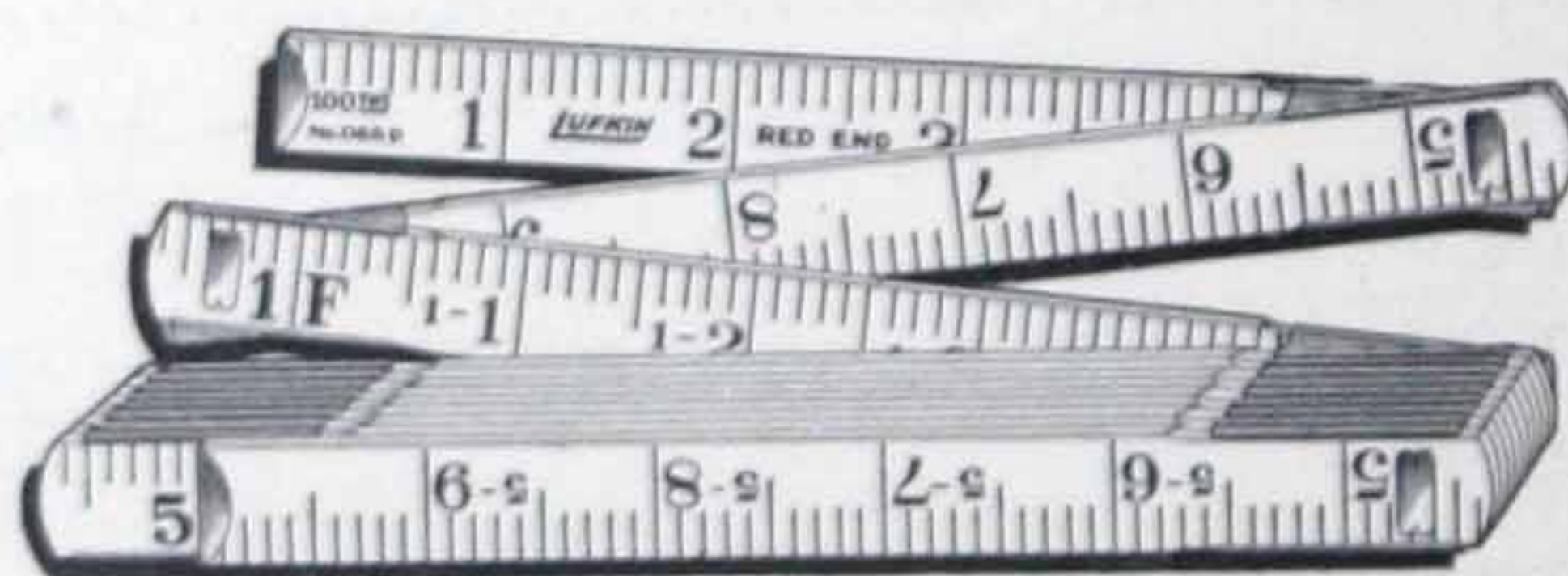
Marked feet and inches one side, feet, 10ths and 100ths other side.

No. 2756. 6 ft.....	SIMOR	No. 2756W. 6 ft.....	SIMUL
---------------------	--------------	----------------------	--------------

Marked consecutive inches one side, metric to millimeters other side.

No. 2766. 6 ft.....	SINNET	No. 2766W. 6 ft.....	SINUS
---------------------	---------------	----------------------	--------------

"RED END" SPRING JOINT RULES



$\frac{5}{8}$ in. wide

"Red End" Rules are the finest of their kind. They are made from choicest materials and are rust-proof throughout. They have concealed joints of solid brass, smooth-working. Brass strike plates on each section prevent wear on markings in opening and closing. Ends brass capped.

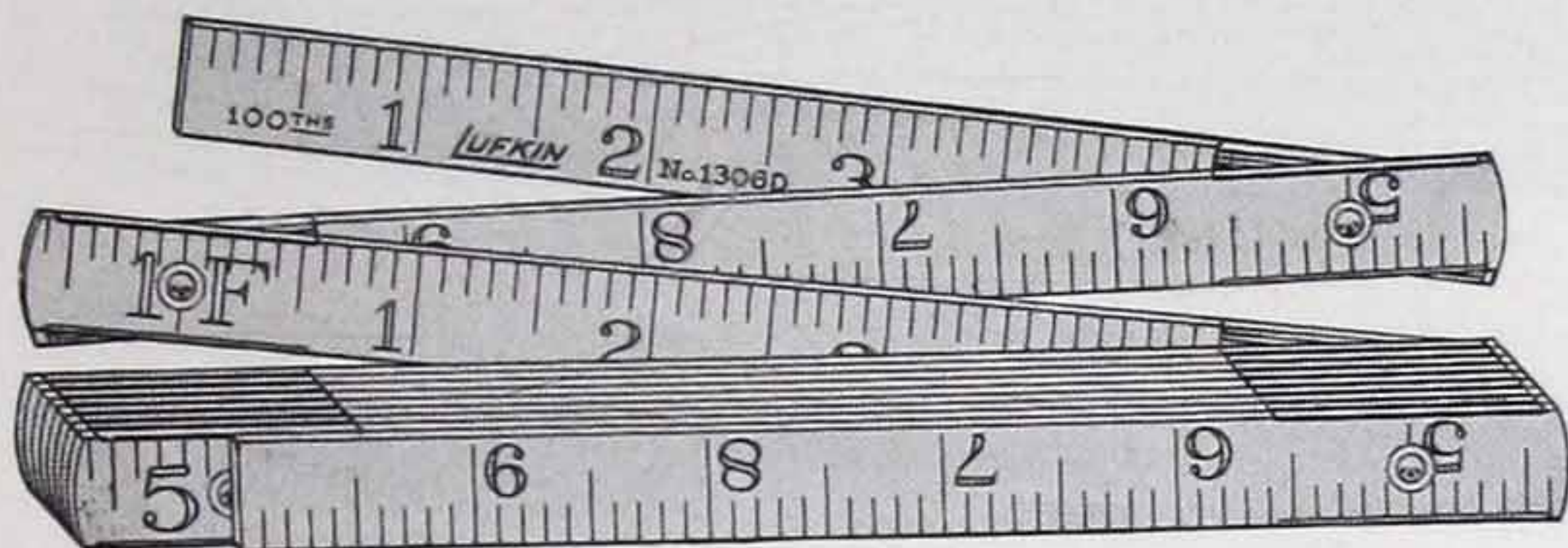
Marked feet and inches one side, feet, 10ths and 100ths other side.

	Code Word
No. 2786W. 6 ft. white enamel, gloss red ends.....	SIORÉ

SEE PRICE LIST IN BACK OF CATALOG

ALUMINUM RULES

Six-Inch Folds. 9/16-Inch Wide



The Aluminum Rule occupies a position between folding wood and steel rules, both as regards weight and durability.

While of a size accommodating good legible markings and figures, it is light and convenient to carry. Being of aluminum and having solid brass joints,

rules are rustproof throughout. The spring joints are of the rivet type. The surface of rule is in natural color, with sunken graduations and figures in black showing up distinctly.

Marked Consecutive Inches to 16ths, Both Sides

No. 2796. 6 ft. Each..... Code Word **SIRDAR**

Marked one side Inches to 16ths, other side Feet to 100ths.
No. 2796D. 6 ft. Each..... **SIRENE**

FOLDING STEEL POCKET RULES



No. 2801



No. 2831

Three-eighths inch wide, flexible spring steel. Raised figures. With patent stop joints that hold rule true and rigid when extended.

Marked Consecutive Inches, divided in 16ths.

No. 2801. 1 ft. 4 in. joints. Each..... Code Word **SIRLOIN**

Marked Inches and 16ths one side, Feet, 10ths and 100ths other side.
No. 2811. 1 ft. 4 in. joints. Each..... **SISS**

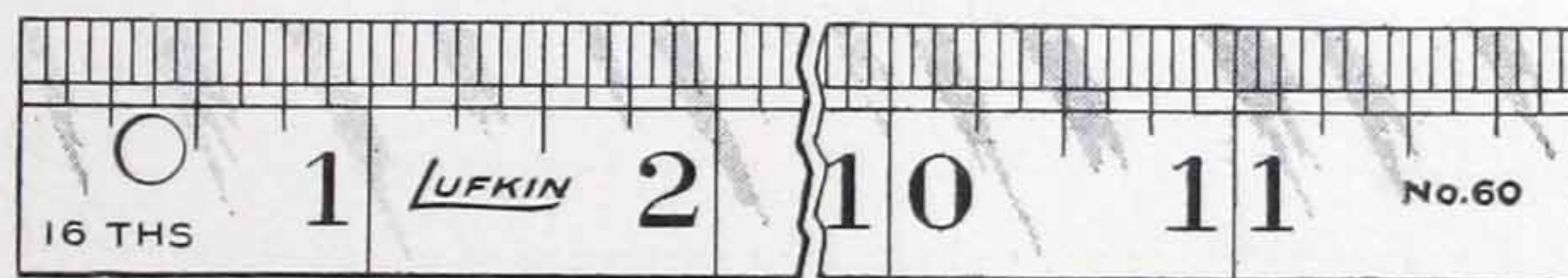
Marked Inches and 16ths one side, Millimeters other side.
No. 2823. 1 meter 4 in. joints. Each..... **SKILLY**

METAL BOUND LEATHER CASES FOR STEEL POCKET RULES

No. 2831. Leather Case for 1 ft. 4 in. joint rule. Each..... Code Word **SKIM**

No. 2833. Leather Case for 1 meter, 4 in. joint rule. Each..... **SKIPPER**

MANUAL TRAINING STEEL RULES



A tempered steel rule graduated to 16ths, popular for school shop and other uses. $\frac{3}{4}$ inch wide, $\frac{1}{32}$ inch thick. Has machine divided, sunken lines and figures in black, contrasting with the steel rule surface. Opposite sides read from reverse ends. Hole in one end for hanging up.

Always Specify Stock Number and Length

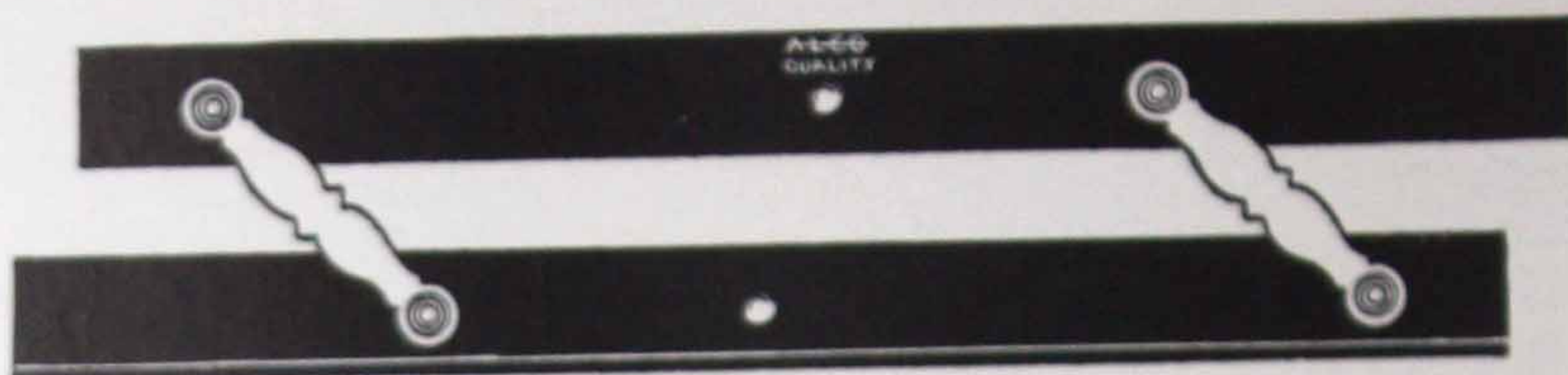
Marked Upper Edge of Both Sides; One Side 8ths, Other Side 16ths Inch

No. 2841. 1 ft. Steel Rule..... Code Word **SKIR**

No. 2842. 2 ft. Steel Rule..... **SKIRTH**

SEE PRICE LIST IN BACK OF CATALOG

LIETZ PARALLEL RULES



Ebony, Nickel-Plated Bars

		Code Word
No. 2861.	6 in.....	SLACK
No. 2862.	12 in.....	SLACKER
No. 2863.	15 in.....	SLAG
No. 2864.	18 in.....	SLAKE
No. 2865.	24 in.....	SLAND

METAL ROLLING PARALLEL RULES

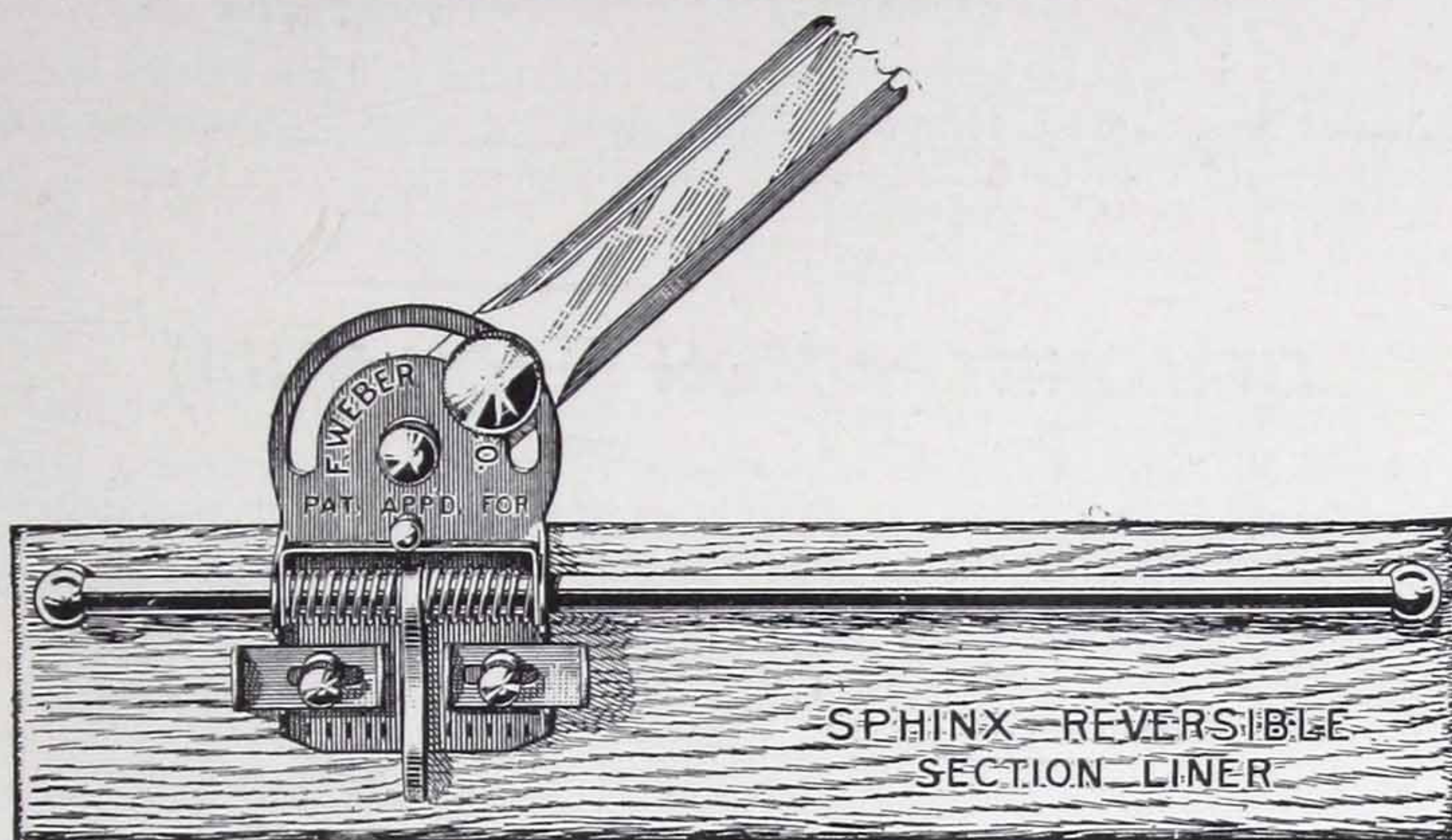


Lietz Metal Rolling Parallel Rules are considerably heavier than those usually offered. They are of the finest quality. The blade is nickel plated, satin finish, the axle guard in rich black baked enamel. They are designed to assure greatest accuracy of motion.

		Code Word
No. 2932.	12 in.....	SLAVEY
No. 2934.	18 in.....	SLAVIC
No. 2935.	24 in.....	SLAVON
No. 2932C.	12 in., in polished mahogany case.....	SLAVECA
No. 2934C.	18 in., in polished mahogany case.....	SLAVICCA
No. 2935C.	24 in., in polished mahogany case.....	SLAVOCA

SEE PRICE LIST IN BACK OF CATALOG

REVERSIBLE SECTION LINER



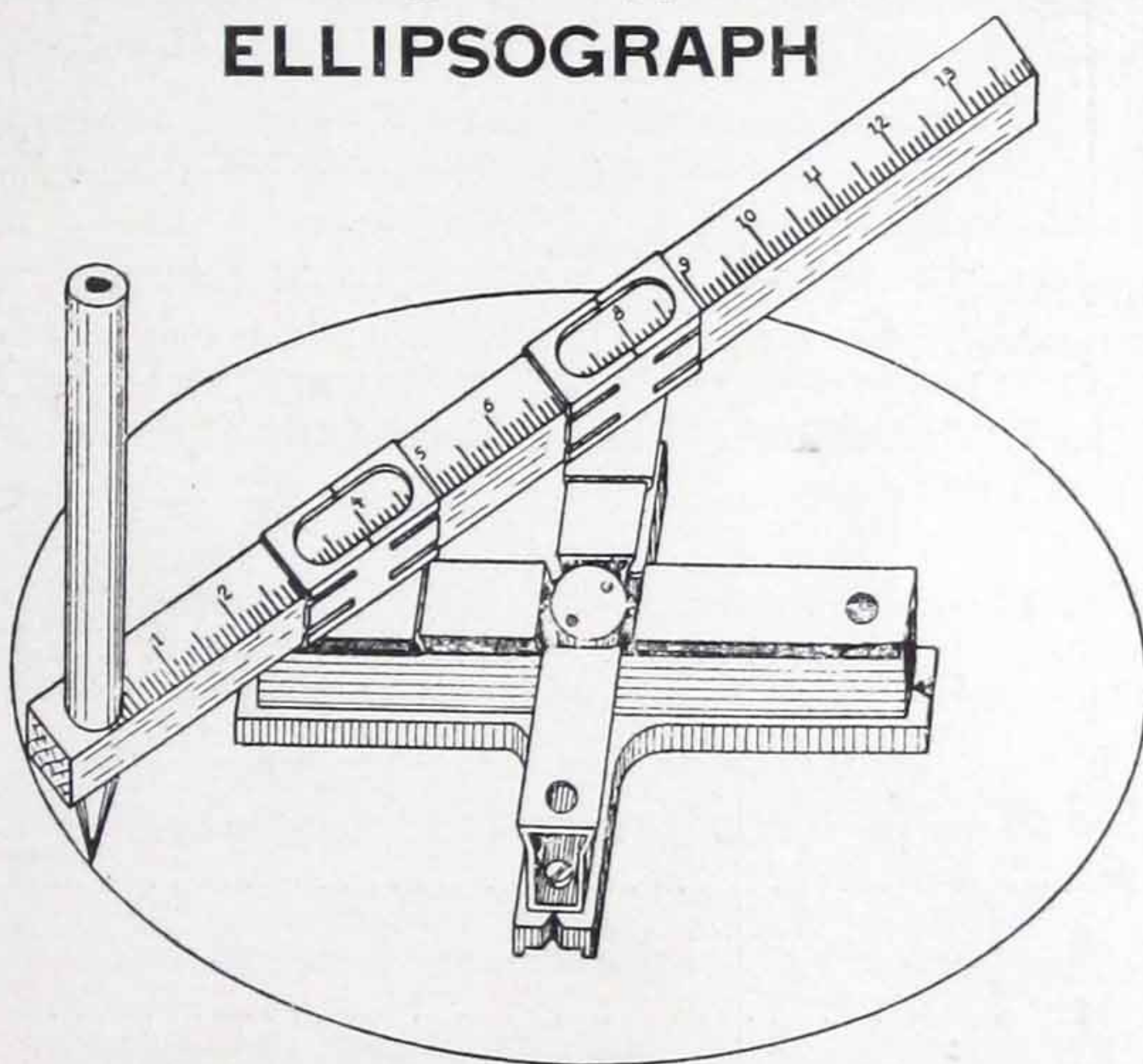
No. 2948

No. 2948. Reversible Section Liner, hardwood with nickel-plated mountings and 7 in. amber rule, in imitation morocco case. Code Word

No. 2949. Same as No. 2948 but with 15 in. amber rule. **SLOOP SLOTH**

Section Liners No. 2948 and 2949 are called **Reversible** because they operate both from left to right and from right to left. The bar is stationary and the whole liner occupies but a space on the drawing board $8\frac{3}{4}$ in. long.

ELLIPSOGRAPH



No. 2951

With these instruments ellipses of any shape can be quickly drawn.

No. 2950. Ellipsograph. Beam $4\frac{3}{4}$ inches long, divided in inches and millimeters. Cross-track constructed of brass neatly finished. For use with ordinary pencil. Minimum radius 1 inch, maximum radius 4 inches. Code Word

No. 2951. Ellipsograph. Same as No. 2950; beam 8 inches long; minimum radius 2 inches; maximum radius 8 inches. **SAMMILE**

No. 2952. Ellipsograph. Similar to No. 2951 with two beams, 8 inches and 10 inches long. Fitted with pen and pencil attachment. Minimum radius 2 inches, maximum radius $9\frac{1}{2}$ inches. **SAMMY**

SEE PRICE LIST IN BACK OF CATALOG

SLIDE RULES

The Slide Rule is an indispensable aid to anyone who in his business is called upon to make calculations. The principles with which one must be familiar are few and simple and are easily mastered with little practice.

DEMONSTRATION SLIDE RULE

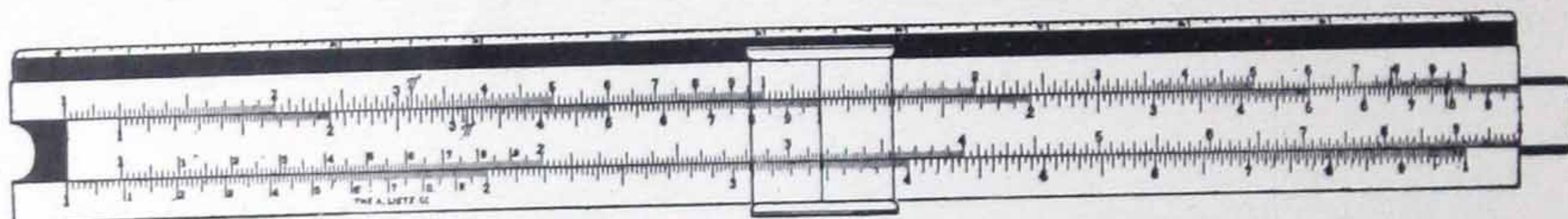
Demonstration Slide Rules for educational purposes are strongly built of well seasoned hardwood. They are light in weight and can be easily carried or hung on the wall. Complete with indicator.

- | | | Code Word |
|-----------|--|---------------|
| No. 2958. | Demonstration Slide Rule, 84 inches long; graduated like No. 2964..... | STAG |
| No. 2959. | Demonstration Slide Rule, 94 inches long; graduated like No. 3054..... | STAGAL |

MANNHEIM SLIDE RULES

Best Quality

Adjustable



These Rules are engine divided on white celluloid facings. The divisions are clear, distinct, permanent and accurate. On the upper face are two sets of logarithmic scales, A, B, C, and D. On the under side of the slide are the S and T scales for carrying out trigonometrical calculations. Also a logarithmic L scale for easily determining higher powers and roots.

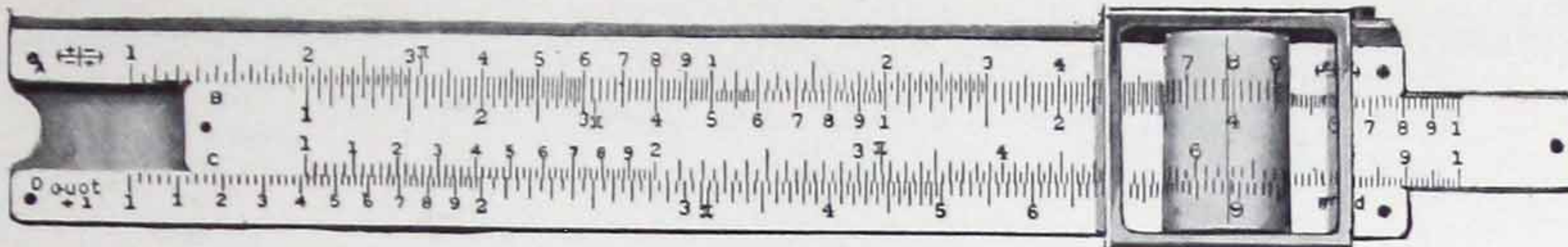
- | | | Code Word |
|------------|--|-----------------|
| No. 2960. | 5-inch Mannheim Rule in sewed leather case, with instructions. Each.....
This rule is subdivided as closely as the 10-inch rule No. 2964. | STAGER |
| No. 2964. | 10-inch Mannheim Rule in morocco case, with instructions. Each..... | STAGY |
| No. 2969. | 20-inch Mannheim Rule in morocco case, with instructions. Each.....
Rule No. 2969 has from 200 to 20 subdivisions between the prime numbers, while the shorter rules have from 100 to 10, therefore the reading is closer by at least one figure. | STALLAGE |
| No. 3060H. | Glass Indicator with two hairlines instead of one, add..... | STALLER |

For complete line of Indicators, Instruction Books and Slide Rule Accessories, see page 325.

SEE PRICE LIST IN BACK OF CATALOG

VEST POCKET SLIDE RULES

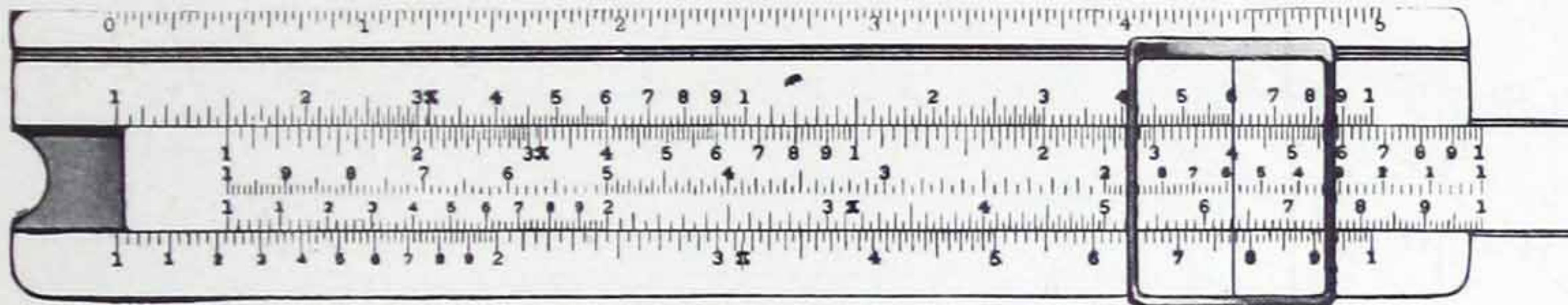
The slide rules listed on this page are so designed and proportioned as to fit the vest pocket. They are accurately engine divided on white celluloid facings; perfected body construction; will not warp or get out of adjustment.



No. 2970

- No. 2970.** Junior Slide Scale, 4 inch, Mannheim type; with A, B, C, D, S, L and T Scales; magnifying indicator, in leather case with instructions..... **STALWART**

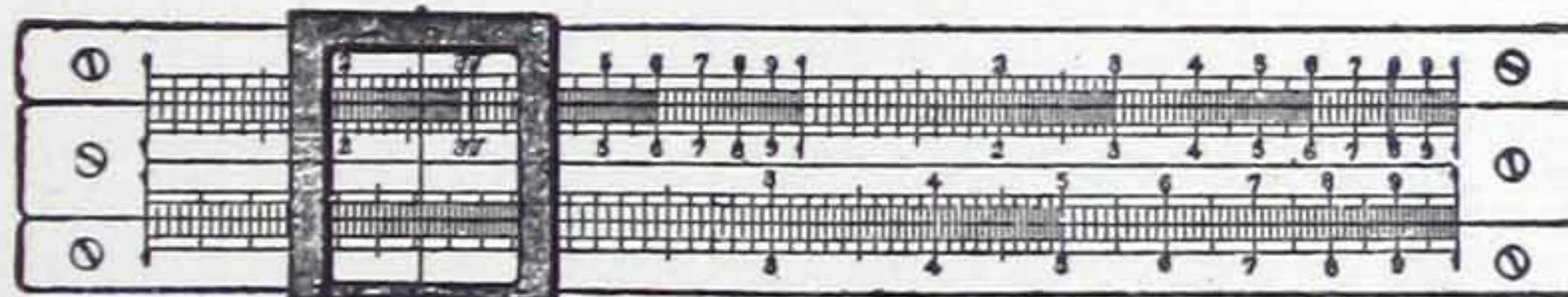
Code Word



No. 2971

- No. 2971.** Vest Pocket Slide Rule, 5 inch, very thin model, Mannheim type; with A, B, C, D, CI, S, L and T scales; in leather sheath with instructions..... **STAMAS**

Code Word



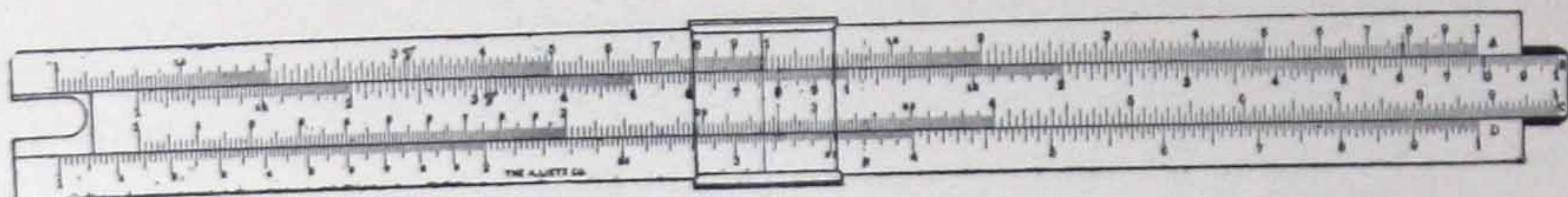
No. 2972

- No. 2972.** Junior Slide Rule, 4 inch, Mannheim type; with A, B, C, D, S, L and T scales; in leather case with instructions..... **STAMEN**

Code Word

SEE PRICE LIST IN BACK OF CATALOG

STUDENTS' SLIDE RULE



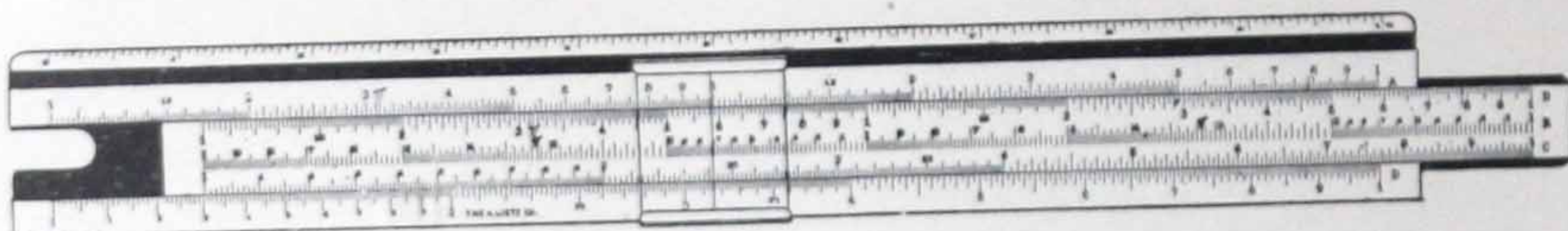
- No. 2974. Students' (Mannheim) Slide Rule, 10 inch, engine divided on white celluloid facings; with A, B, C, D, S, L and T scales; glass and metal indicator; in fabricoid case, with instructions. **STANHOPE**

Code Word

THE ZENITH SLIDE RULE

Best Quality

Adjustable



The Zenith Slide Rule has in addition to the regular scales of the Mannheim Rule a scale of cubes and an inverted scale through the center of the slide. These scales may be used in connection with the others, by means of the indicator. The inverted scale enables taking three factors at one setting of the slide, and reading reciprocals by means of the indicator. Almost any combination of three factors involving square, square root, cube and cube root may be solved at one setting of the slide.

Rules are engine divided on white celluloid facings. The divisions are clear, distinct, permanent and accurate.

- | | | |
|------------|--|----------------|
| No. 2980. | 5-inch Zenith Rule in sewed leather case, with instructions. Each. | STATER |
| No. 2984. | 10-inch Zenith Rule in morocco case, with instructions. Each. | STATIC |
| No. 2984L. | 10-inch Zenith Rule like No. 2984, in leather case, with instructions. Each. | STATITE |
| No. 2989. | 20-inch Zenith Rule in morocco case, with instructions. Each. | STATUE |

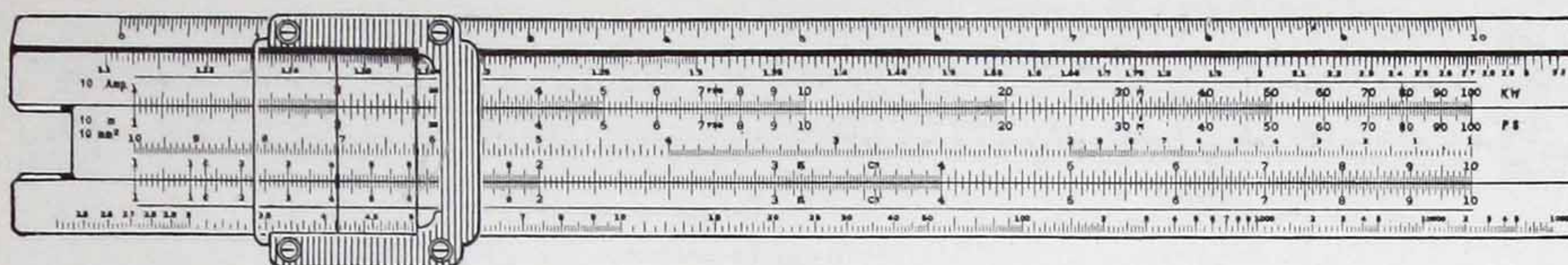
Code Word

NOTICE

Owing to the large variety of Slide Rules now being offered for varied or special purposes, we have listed only such types as are widely used. We are in position to furnish any type of slide rule which may better suit the requirements of our trade.

SEE PRICE LIST IN BACK OF CATALOG

THE ELECTRIC SLIDE RULE



Especially evolved in response to a demand for a suitable Slide Rule for Electrical Engineers and for students in Electro-Technology.

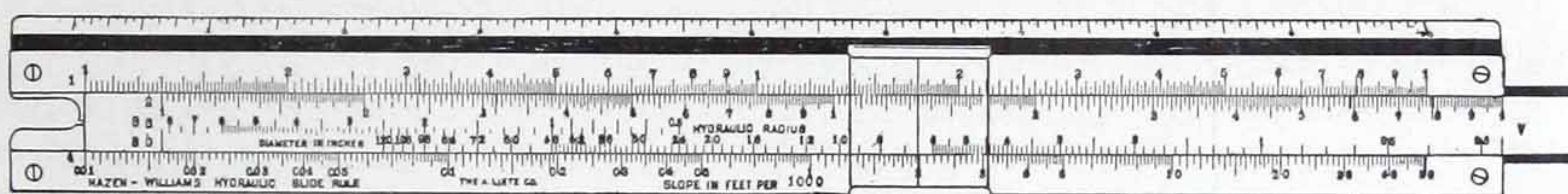
Serves in an excellent manner the facility of calculation of all electro-technological problems. The table of constants, on the reverse of the rule, makes the reference to hand-books almost superfluous.

Engine divided on white celluloid facings. The divisions are clear, distinct, permanent and accurate.

No. 3034. 10-inch Electric Slide Rule, in morocco case with directions.

Each.....Code Word, **STELLATE**

HAZEN-WILLIAMS HYDRAULIC SLIDE RULE



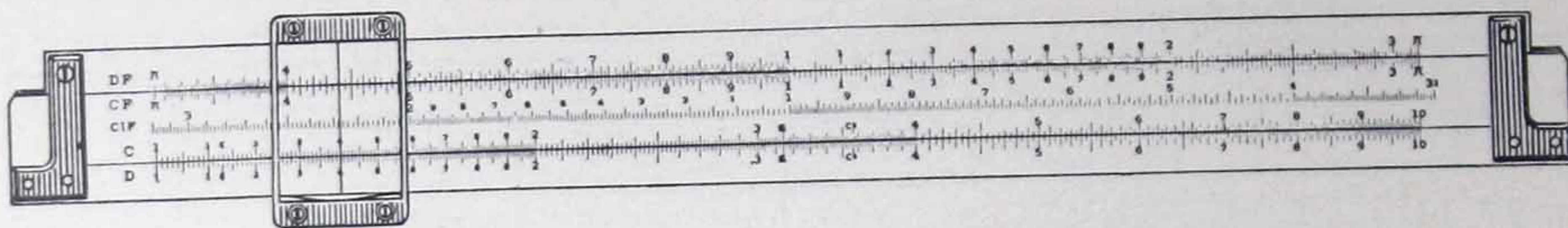
No. 3044

The Hazen-Williams Hydraulic Slide Rule is used principally for determining the velocity and quantity of the flow of water in pipes and channels, but is also adapted for ordinary slide rule calculations. Special computations may also be solved by its use, as, for instance, to determine the corresponding flow at any other slope or head, when the flow of water through a pipe or system of pipes produced by a given slope or head is known; to find what size of pipe must be used to produce the same discharge for any other slope, when the discharge in a given size of pipe at a given slope is known; to compute the discharge through a compound pipe, that is, a pipe of larger diameter connecting with a pipe of smaller diameter, or a series of such pipes; to compute the friction of a given amount of water flowing through two pipes of different diameters and different lengths, freely connected at each end; to get with one setting of the slide the quantity of water corresponding to any slope; to get with one setting of the slide the quantities of water discharged by pipes of different sizes for a given slope and coefficient. In size and general appearance the rule is like an ordinary Mannheim 10-inch slide rule. On the back of the rule are several tables to aid in the convenience of computations to which the rule is applicable. Engine divided on white celluloid facings. The divisions are clear, distinct, permanent and accurate.

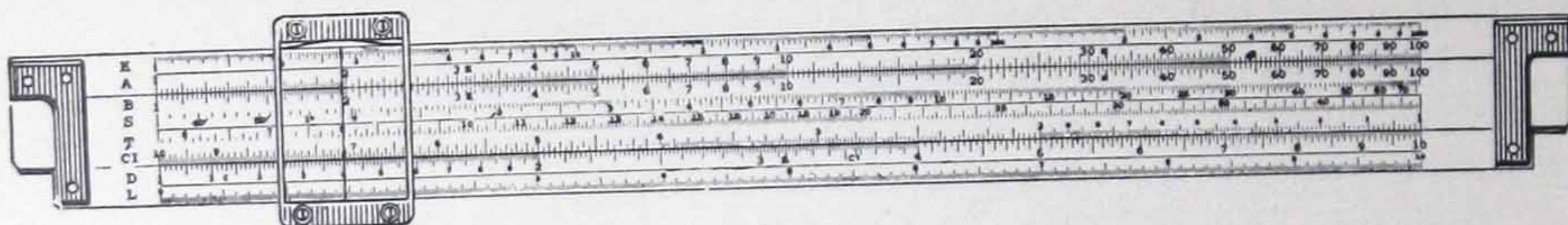
No. 3044. 10-inch Hazen-Williams Hydraulic Slide Rule, in morocco case, with directions.....Code Word, **STEREO**

SEE PRICE LIST IN BACK OF CATALOG

THE DOUBLE MULTIPHASE SLIDE RULE



Front



Back

Code Word

- No. 3054. Double Multiphase Slide Rule, 10 in. Engine divided on white celluloid facings. With double indicator in morocco case with instructions..... **STICCADO**
- No. 3054L. Same as No. 3054 in sewed leather case..... **STILETTO**

The Double Multiphase Slide Rule is graduated on both sides with several special scales which the single face slide rules do not have. These scales in connection with the usual logarithmic scales and inverted scale make this rule valuable in the solution of problems involving exponentials, reciprocals and multiplication involving several factors. Being graduated on both sides, involved computations can be made with a minimum number of settings as the indicator circles the rule thus making it possible to read any scale in connection with any other scale.

The Double Multiphase Slide Rule has the following scales:

DF, a folded D scale. (The graduations begin and end near the middle of the scale with the division 3.1416 in line with the D scales indexes.)

CF, a full length C scale, folded like the DF scale.

CIF, a full length inverted folded C scale.

C, a full length C scale.

D, a full length D scale.

On the other face of the rule are the following scales:

K, a scale consisting of three complete logarithmic scales. (Used in connection with the D scale for cubes and cube roots.)

A, two complete logarithmic scales (used in connection with the D scale for cubes and cube roots.)

B, similar to the A scale.

S & T, the usual trigonometrical scales of sines and tangents.

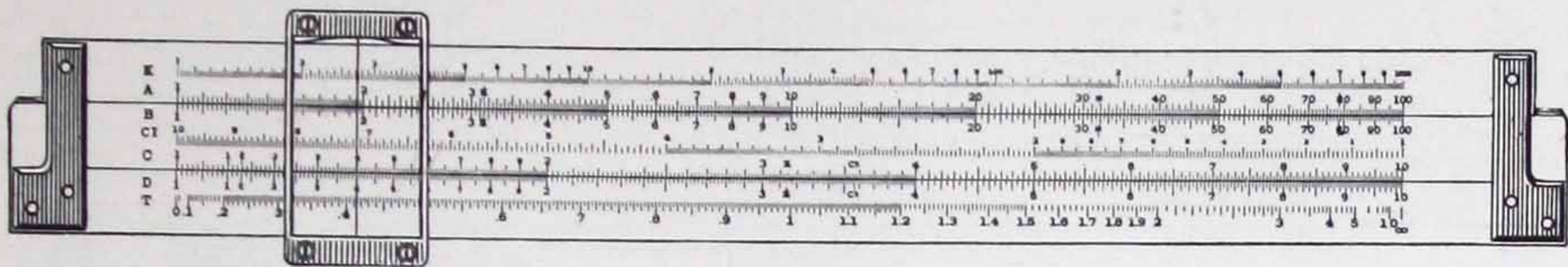
CI, a full length C scale inverted.

D, a full length regular D scale.

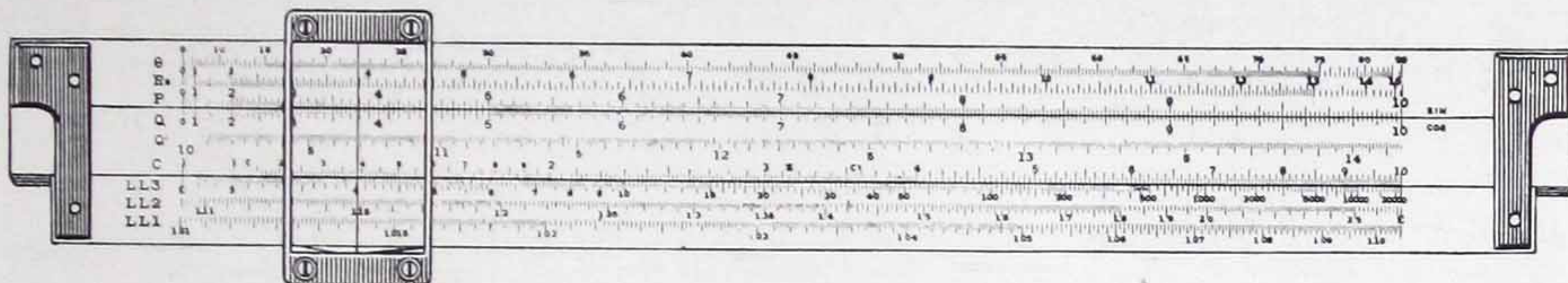
L, a scale of equal parts (for finding logarithms of numbers.)

SEE PRICE LIST IN BACK OF CATALOG

DOUBLE MULTI-LOG SLIDE RULE



Front



Back

No. 3056L. Double Multi-Log Slide Rule, 10 inches. Engine divided on white celluloid. With double indicator, in sewed leather case. This rule is similar to our No. 3054L, but has, in addition, the Log Log Scales.

.....Code Word, **STIMAN**

The Double Multi-Log Slide Rule has the following scales:

K, a standard logarithmic scale of three units for reading cubes and cube roots directly.

A, a standard logarithmic square scale divided 1 to 100 for reading squares and square roots.

B, same as A, logarithmically divided 1 to 100.

CI, a standard C scale inverted. When used with C scales gives reciprocals by hairline, including confunctions (trig.).

C, a logarithmic scale divided 1 to 10 for multiplication and division when used in conjunction with D scale.

D, same as logarithmic C scale. When used with A scale gives the squares and with K gives the cubes.

T, gives tangent of θ angle directly from θ scale by use of hairline. Trigonometric function read directly up to 84.5° , as sines read directly up to 90° .

On the other face of the rule are the following scales:

θ , a trigonometric scale decimally divided to degrees and tenths of degrees. This scale is of special interest to the engineering field as trigonometric functions are read directly to 90° when used in conjunction with P, T, or Q scales.

R θ , a standard radian scale giving radians and percentages thereof, of θ angles.

P, a decimally divided sine scale, for directly solving $\sqrt{a^2 \pm b^2}$

Q, a decimally divided cosine scale, used with P scale.

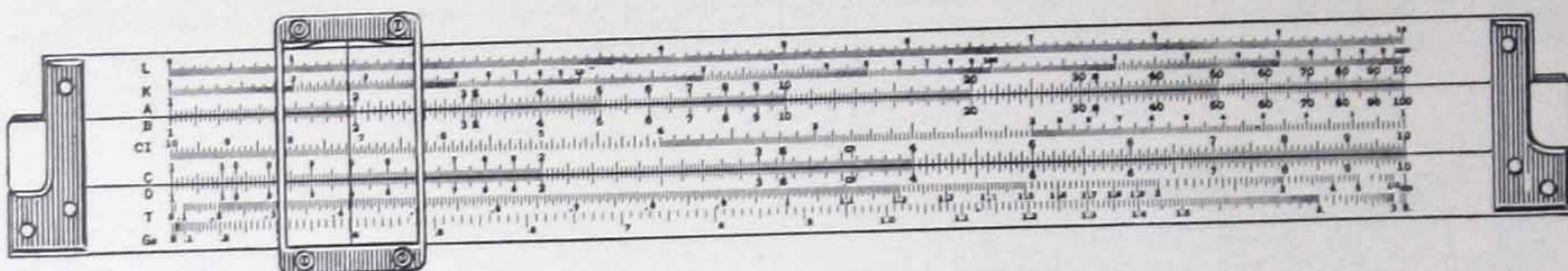
Q', this is an extension of Q scale, used with P scale.

C, this is a single logarithmic scale divided 1 to 10.

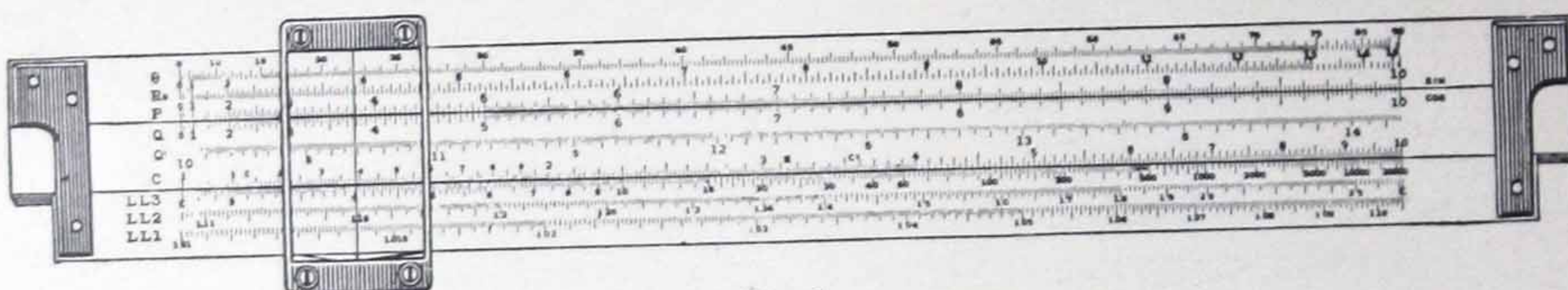
LL1, LL2, LL3, Continuous Log Log Scales in three parts.

THE DOUBLE MULTI-LOG SLIDE RULE

with
New Patented Gudermanian Scale



Front



Back

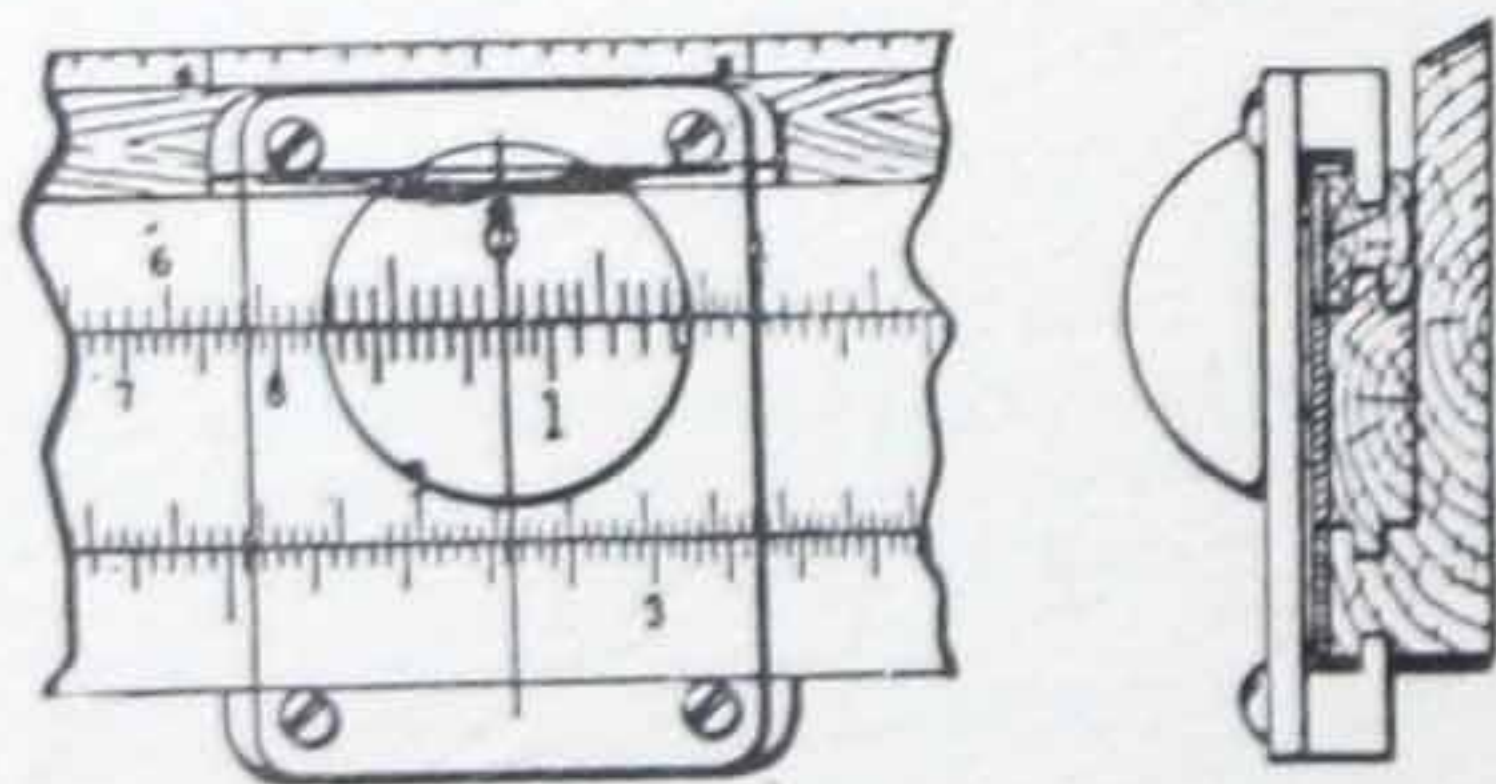
No. 3057L. Double Multi-Log Slide Rule, 10", engine divided on white celluloid facings, with double indicator, in sewed leather case, with instructions.....**STIMASH**

Code Word

This rule is similar to our No. 3056L but has the following additional scales:
L, an equal parts scale, used with D scale to secure directly, the logarithm of any number.

G θ , a new patented Gudermanian (theorem) Scale. Reads directly $\sinh \theta$, $\tanh \theta$, $\operatorname{gd} x$, also hyperbolic cofunctions $\cosh \theta$, $\coth \theta$ and $\operatorname{cosech} \theta$.

THE SLIP-LENS MAGNIFIER



The Slip-Lens Magnifier is instantly attached to the slide rule indicator by slightly moistening its underside. It will instantly adhere to the indicator glass but can be moved up or down without taking it off the indicator. It magnifies the graduations about twice the actual size evenly and clearly in all directions. It need not be centered on the hair line but will give accurate reading from any position on the glass runner.

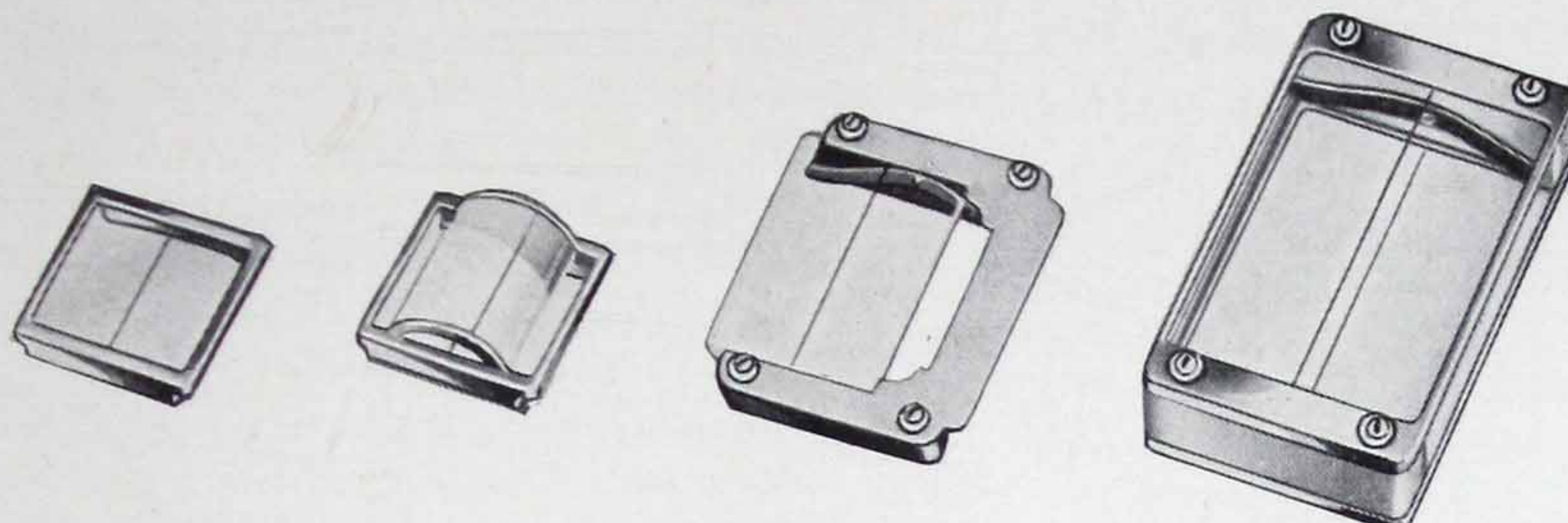
No. 3058. Slip-Lens Magnifier. Each.....**STIMER**

Code Word

SEE PRICE LIST IN BACK OF CATALOG

SLIDE RULE ACCESSORIES

INDICATORS



- No. 3060A.** Complete indicator for standard slide rule such as No. 2964, 2984, 3034, etc.
- No. 3060B.** Complete indicator for 20 inch rule such as 2969, etc.
- No. 3060C.** Complete indicator for double faced slide rule such as Nos. 3054, 3056, etc.
- No. 3060D.** Complete indicator with magnifier for slide rule No. 2970.
- No. 3060E.** Complete indicator for slide rule No. 2971.
- No. 3060F.** Complete indicator for slide rule No. 2972.
- No. 3060G.** Complete indicator for students' slide rule No. 2974.

GLASSES ONLY FOR INDICATORS

- No. 3062A.** For Slide Rules up to and including 10 in. long, each.....
- No. 3062B.** For Slide Rules over 10 in. long, each.....

Be sure to specify the number of the rule for which indicator or glass is desired.

MAGNIFIERS

- No. 3065.** Detachable Magnifier for Slide Rule Indicator. Each.....
When ordering please specify for which Slide Rule the Magnifier is wanted.

CASES FOR SLIDE RULES

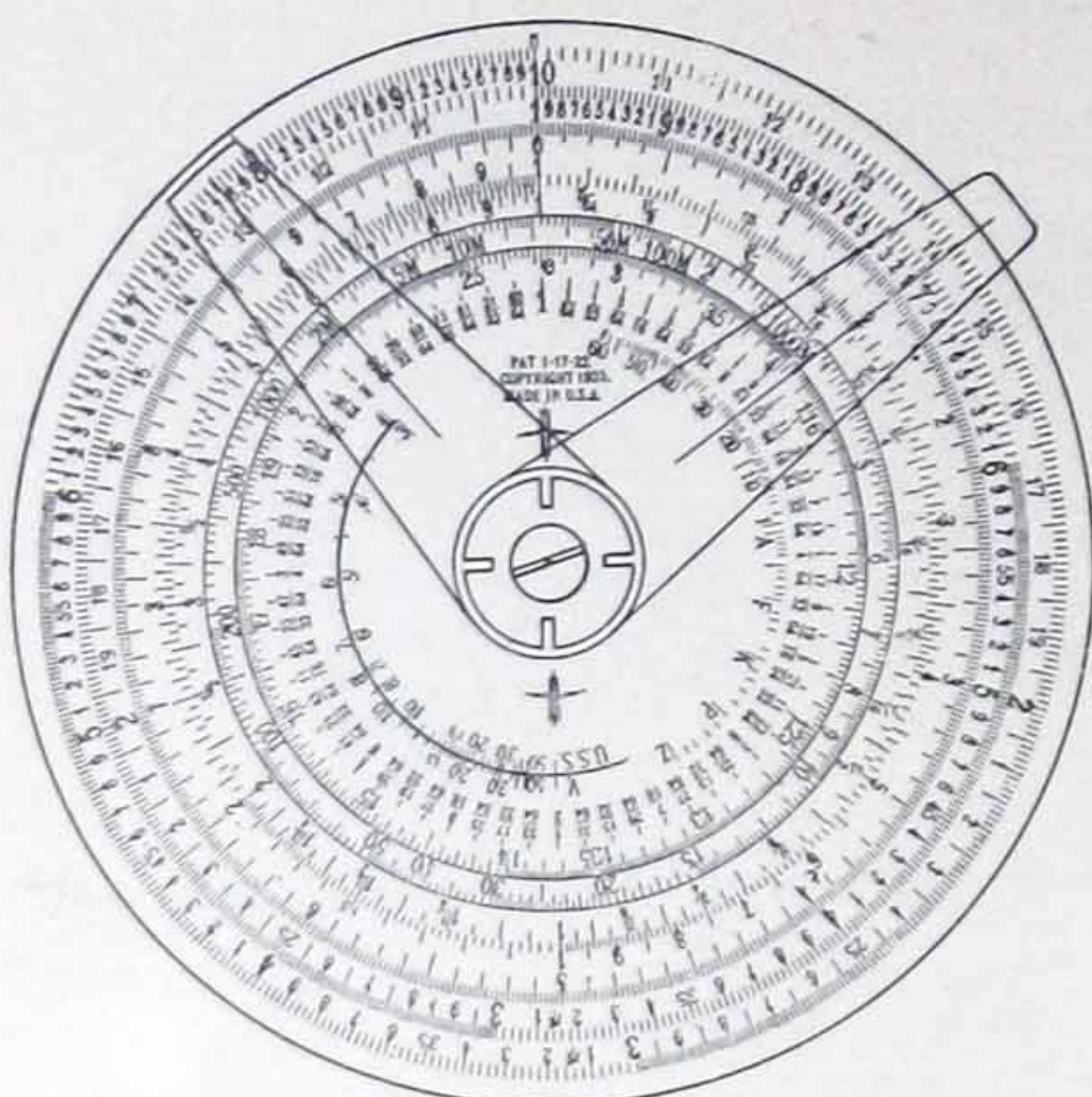
- | | | | |
|--|---|----|----|
| No. 3068. Morocco Case for Slide Rules. | | | |
| Inches long— | 5 | 10 | 20 |
| Each..... | | | |
| No. 3069. Sewed Leather Case for Slide Rules. | | | |
| Inches long— | 5 | 10 | 20 |
| Each..... | | | |
| No. 3069M. Sewed Leather Case with space for Magnifier. | | | |
| Inches long— | 5 | 10 | 20 |
| Each..... | | | |

INSTRUCTION BOOK FOR SLIDE RULES

- No. 3070.** Instructions in the use of Slide Rules. 30 pages of complete instructions for all our slide rules with illustrations and examples. Paper Cover. Each.....

SEE PRICE LIST IN BACK OF CATALOG

THE MIDGET CIRCULAR SLIDE RULE



No. 3077

A most versatile calculator constructed entirely of metal and celluloid; therefore, practically indestructible; 4" in diameter; will solve any problem in multiplication, addition, subtraction and proportion; gives all possible roots and powers of numbers. The "Trig." scales give the Sines, Cosines, Tangents and Cotangents from 0 to 90 degrees and the angle can be read to 1/10 of a degree or to 1 minute, whichever is desired. Fractions and mixed numbers can be added and subtracted direct.

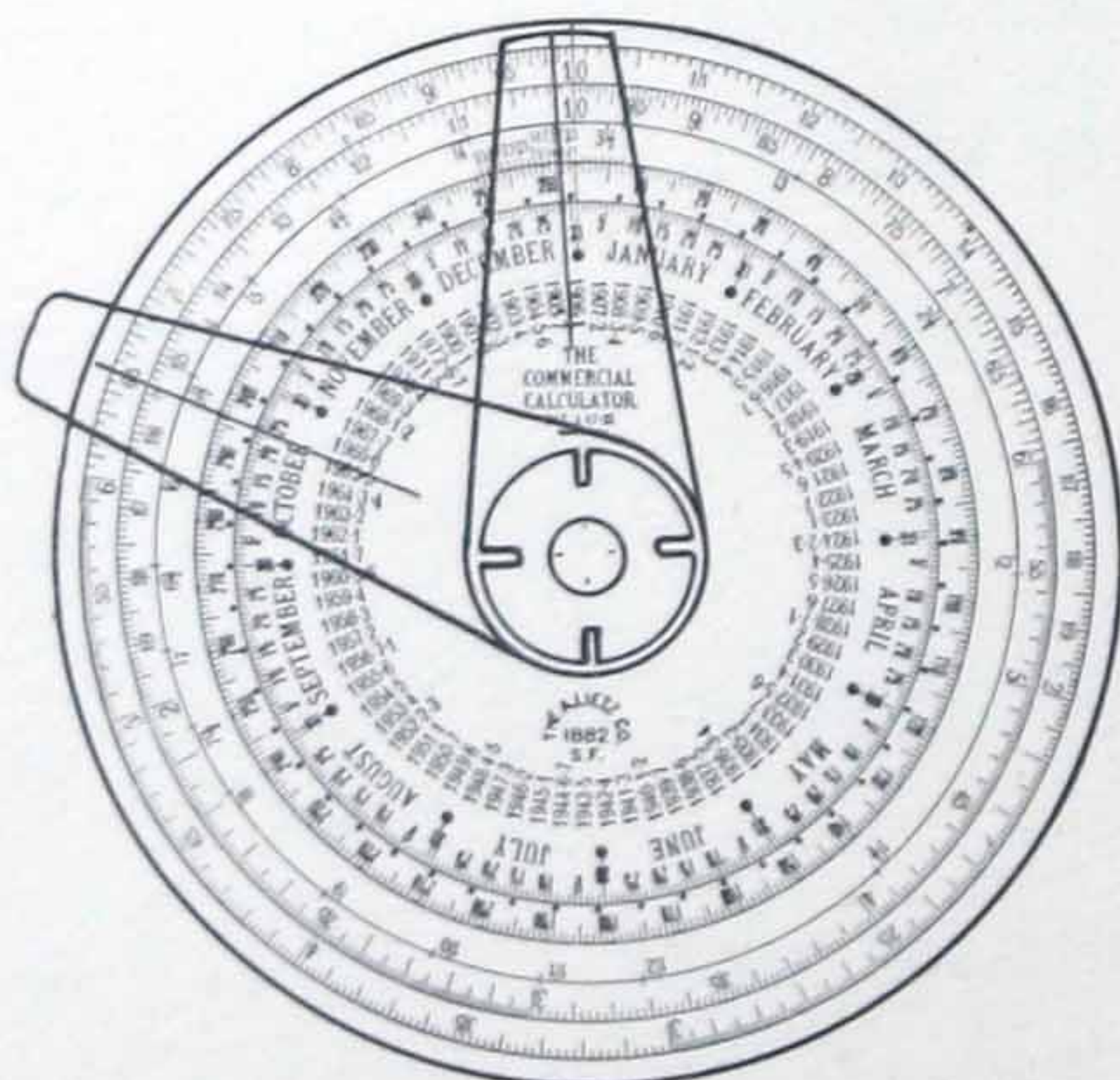
No. 3077. Midget Circular Slide Rule 4" in diameter with instructions, in durable fabrikoid case. Code Word, **SUALL**

APEX CIRCULAR SLIDE RULE

The scales on this rule are similar to those on No. 3077 Midget Slide Rule. The Apex Slide Rule is 8" in diameter and the C scale is more than 25" long and permits reading with great precision.

No. 3078. Apex Slide Rule, 8" in diameter, with instructions. Code Word, **SUARY**

COMMERCIAL CALCULATOR



No. 3079

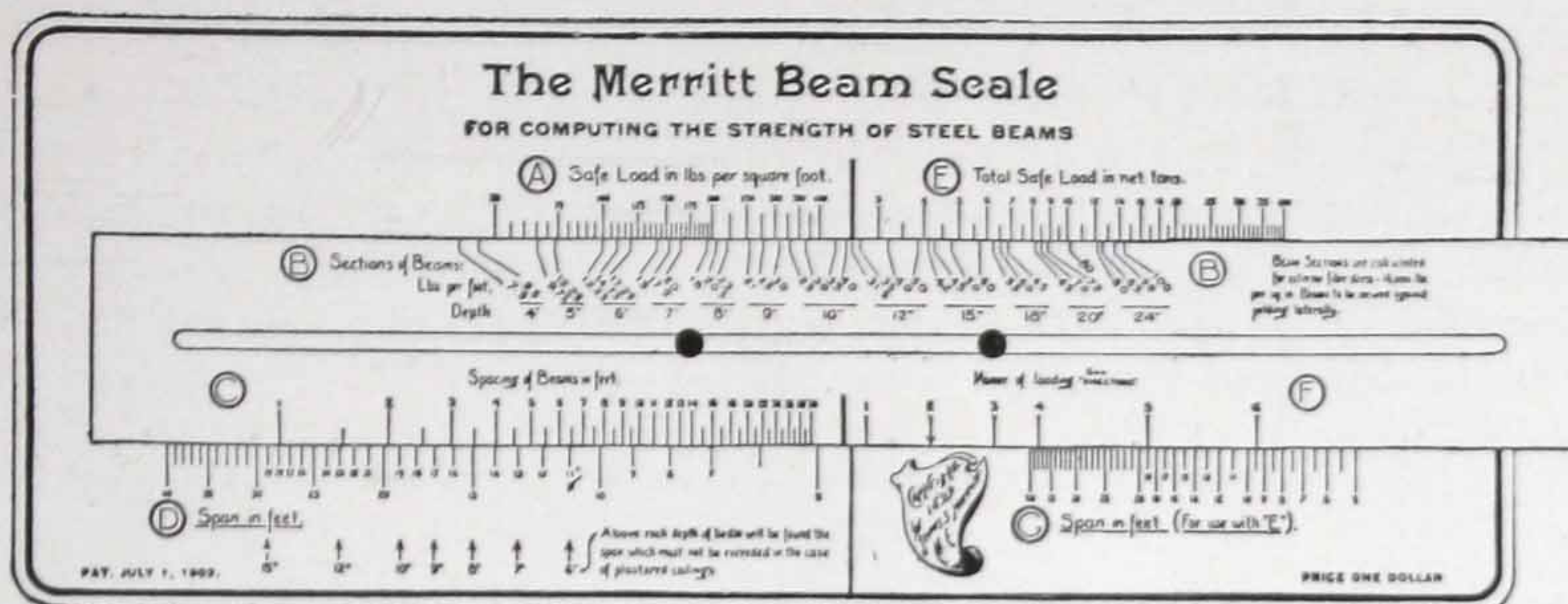
The Commercial Calculator quickly solves the large number of mathematical problems that come up daily in every office. Problems of interest, per cent of profit, freight rates, cost estimation, wages, percentages and proportion can be quickly solved on the Commercial Calculator. Made entirely of metal and celluloid, it is practically indestructible; diameter 5".

No. 3079. Commercial Calculator, 5" in diameter, complete with instructions.
.....Code Word, **SUATE**

SEE PRICE LIST IN BACK OF CATALOG

THE MERRITT BEAM SCALE

For computing the strength of steel beams.



No. 3097

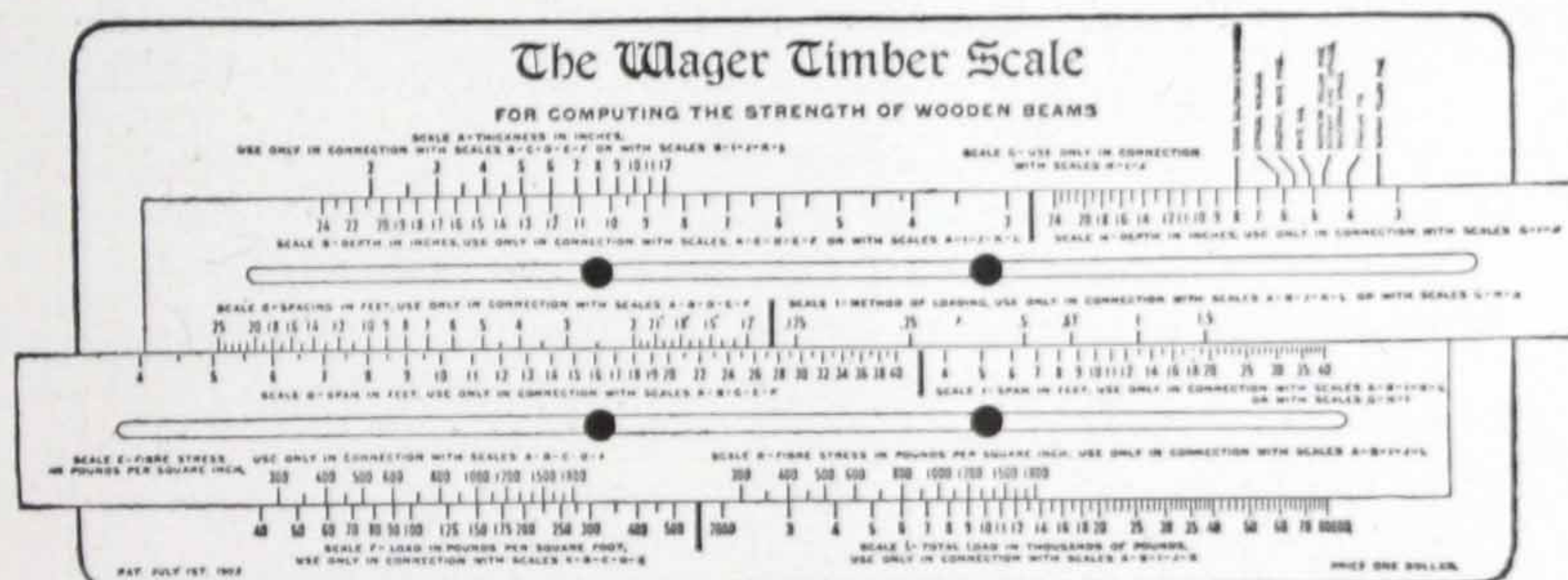
Absolutely accurate. Adapted to all conditions. Load, spacing, span, etc., found instantly. Mistakes absolutely eliminated.

The Merritt Beam Scale for computing the strength of steel beams is based on the principle of the Engineer's Slide Rule and was designed to simplify computations of this kind, and to eliminate all chance of errors. Tables and formulae are absolutely unnecessary when the Merritt Beam Scale is used, and the speed with which answers to widely varying problems may be solved can hardly be appreciated by anyone who has not had the pleasure of using it.

No. 3097. Merritt Beam Scale, on heavy bristol board.....Code Word, **TABARD**

THE WAGER TIMBER SCALE

For computing the strength of wooden beams.



No. 3098

For computing the strength of wooden beams. Absolutely accurate. Adapted to all conditions. Load, spacing, span, etc., found instantly. Mistakes absolutely eliminated.

To illustrate the simplicity of the Scale the following is given:

How far apart shall 6 in. x 12 in. timbers of white oak be placed to safely support a load of 150 pounds per square foot, the span being 18 feet, and New York law governing the design?

Select the fibre stress for white oak allowed in New York City (given on back of scale: 1000 pounds). Place 12 in scale B below 6 in scale A. Place 1000 in scale E over 150 in scale F. Above 18 in Scale D read 2 ft.-0 in. in scale C.

The Wager Timber Scale, for computing the strength of wooden beams, contains more information than could be given in 500 pages of tables. It is based on the principle of the Engineer's Slide Rule, and five minutes' inspection will convince anyone that it is simplicity itself.

No. 3098. Wager Timber Scale, on heavy bristol board.....Code Word, **TABINET**

SEE PRICE LIST IN BACK OF CATALOG

STADIA COMPUTORS

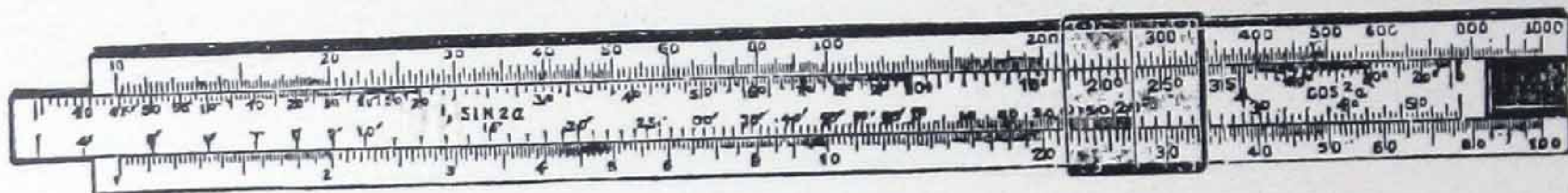
COX STADIA COMPUTOR

The Cox Stadia Computer is a circular slide rule of about fifteen inches effective length. The fixed outer scale, or base, is graduated to the logarithms of numbers from 1 to 1000. The movable inner disc, concentric with it, is graduated on a portion of its circumference to the logarithms of one-half the sine of twice the angles from 3 min. to 45 deg., and inscribed "Difference in Elevation." Another portion of its circumference is graduated to the logarithms of the cosine squared of the angles from 0 to 45 deg., and inscribed "Hor. Distance."

Printed on heavy celluloid, size $5\frac{7}{8} \times 5\frac{7}{8}$ inches, suitable for carrying in coat pocket.

No. 3104. Cox Stadia Computer.....Code Word, **TABOR**

STADIA SLIDE RULES



Code Word

No. 3110. Stadia Slide Rule, engine divided, 10 in., white facing, glass indicator, in morocco case.....**TALARIA**

No. 3111. Stadia Slide Rule, like No. 3110, but 20 in., in morocco case.....**TALIPES**

When the stadia rod reading and elevation of the telescope are known the horizontal distance and vertical height can in every case be obtained at once by one setting (always to the left) of the slide. The rule can also be used for ordinary computations as the under side of the slide has a scale corresponding to the lower scale of the rule and resembling the A and B scale of the ordinary Mannheim rule. Directions are printed on the rule.

STEEL TRIANGLES

No. 3175.	Steel Triangles, nickel plated, open center, 30x60 degrees.		
	Size, inches.....	10½	15
	Code Word.....	TAPIR	

No. 3176.	Steel Triangles, nickel plated, open center, 45 degrees.		
	Size, inches.....	8	12
	Code Word.....	TAPPET	

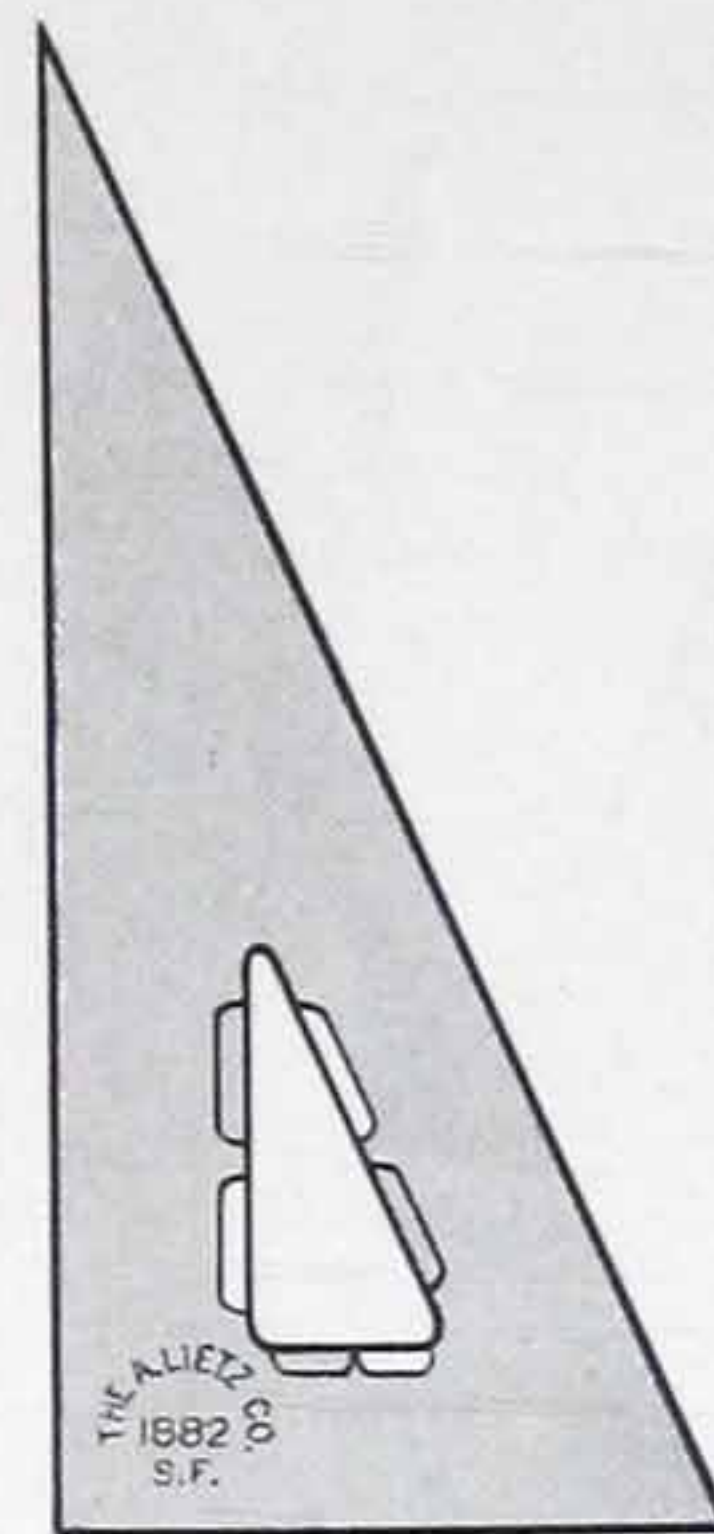
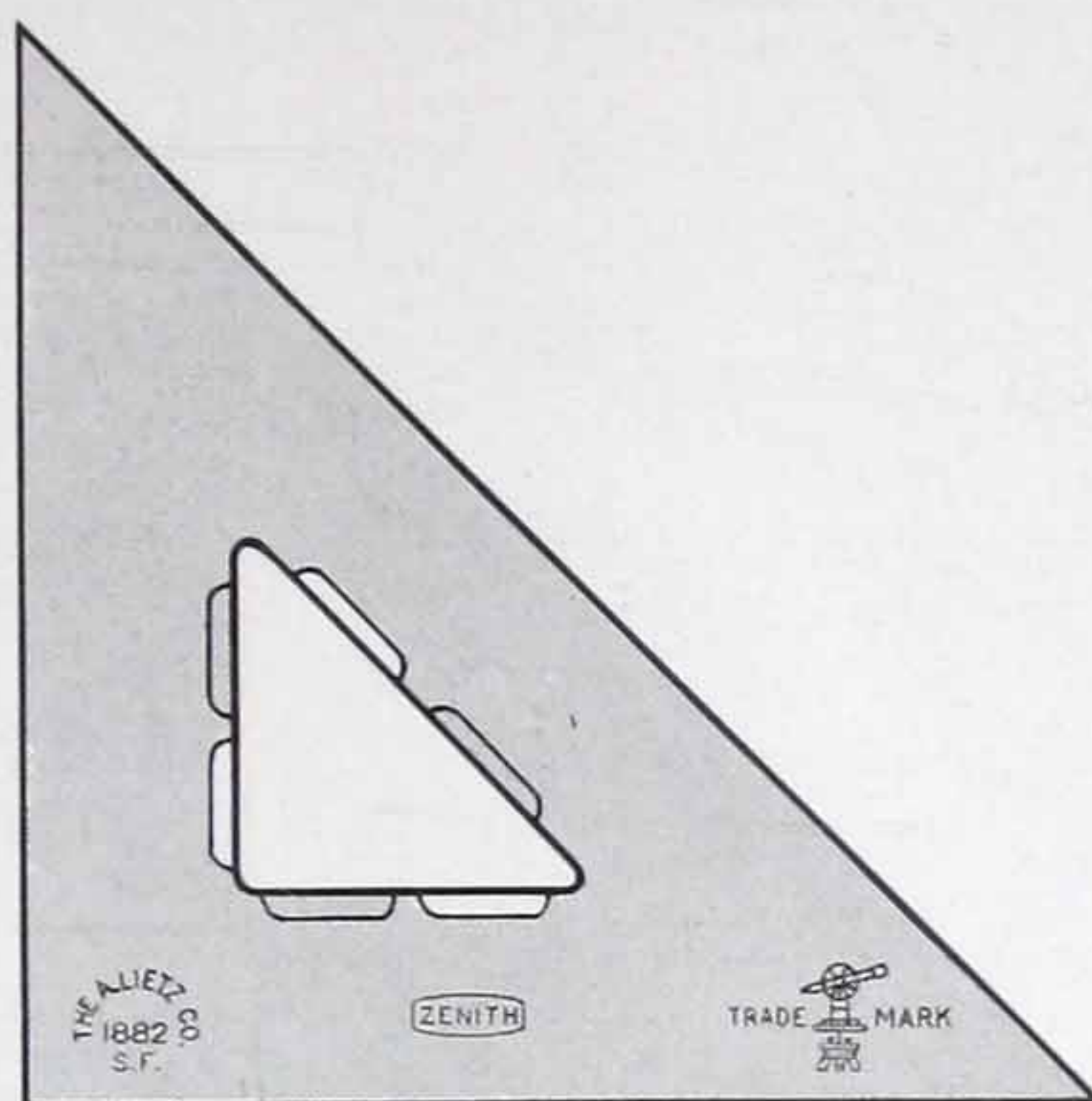
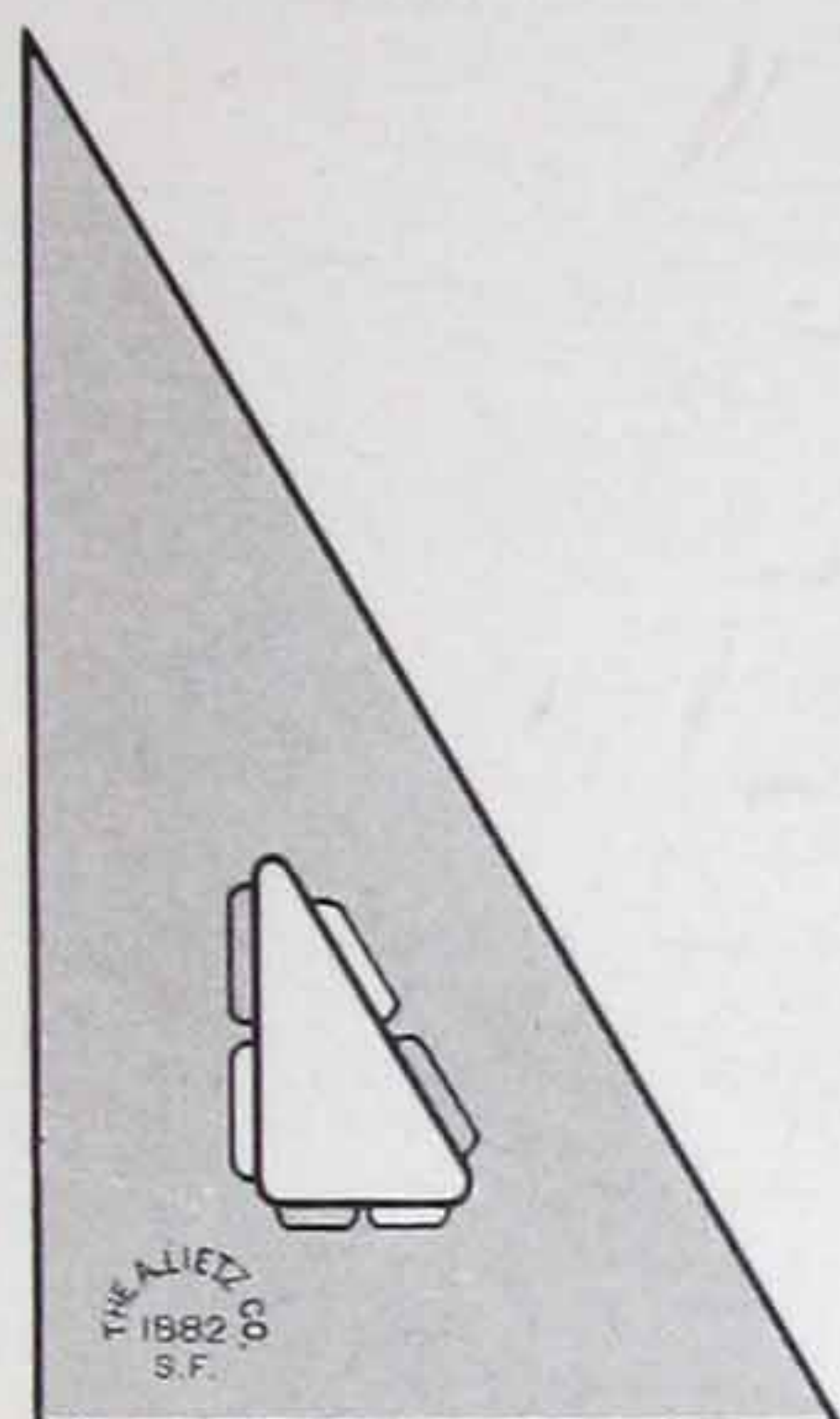
When ordering by telegraph be sure to state SIZE in addition to Code Word.

SEE PRICE LIST IN BACK OF CATALOG

TRANSPARENT CELLULOID TRIANGLES

Best Quality. With finger lifts.

Made in our own factory of heavy, thoroughly seasoned, clear, transparent celluloid, finely polished. Guaranteed to be true and reliable.



No. 3180

No. 3181

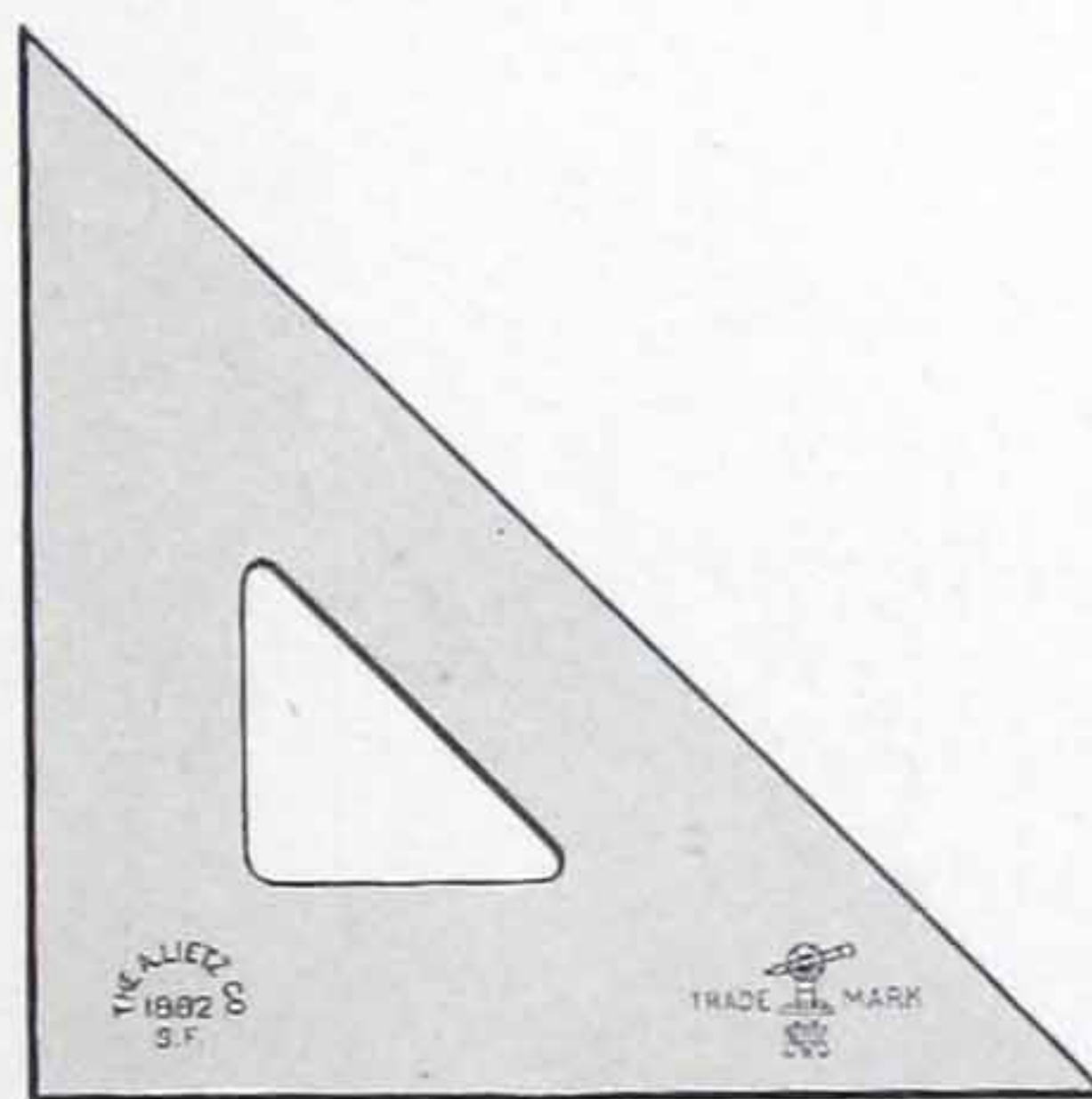
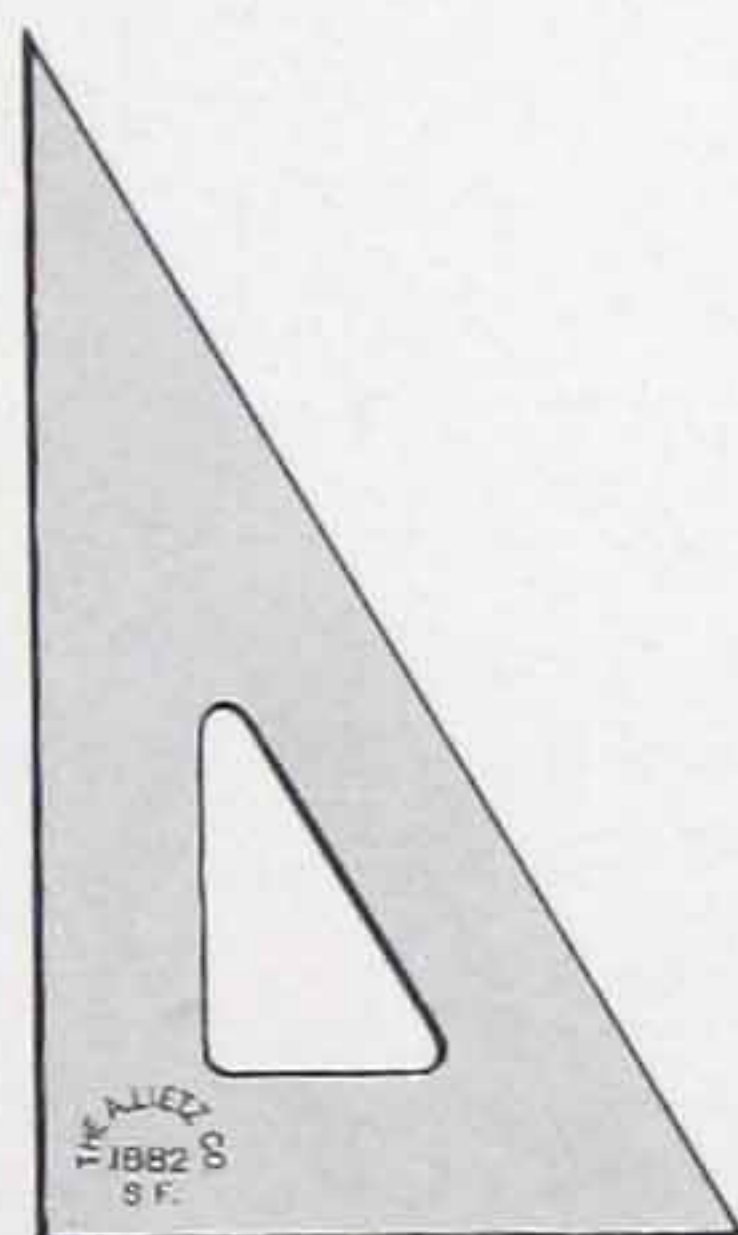
No. 3182

- | | | | | | | | | | | |
|------------------|--|---------------|---|---|---|---|----|----|----|-------|
| No. 3180. | Transparent Triangles, with finger lifts, 30x60 degrees. | | | | | | | | | |
| | Size, inches— | 4 | 6 | 7 | 8 | 9 | 10 | 12 | 14 | 16 18 |
| | Code Word..... | TARRY | | | | | | | | |
| No. 3181. | Transparent Triangles, with finger lifts, 45 degrees. | | | | | | | | | |
| | Size, inches— | 4 | 6 | 7 | 8 | 9 | 10 | 12 | 14 | 16 18 |
| | Code Word..... | TARSUS | | | | | | | | |
| No. 3182. | Transparent Triangles, with finger lifts, 22½x67½ degrees. | | | | | | | | | |
| | Size, inches— | | | | | | | 4 | 6 | 8 10 |
| | Code Word..... | TARTAN | | | | | | | | |

When ordering by telegraph be sure to state SIZE in addition to Code Word.

School Quality. Without finger lifts.

School Quality Angles are made of clear, transparent celluloid carefully selected and are equally as accurate as other grades. Somewhat lighter in weight they do not have the same high polish.



No. 3185

No. 3186

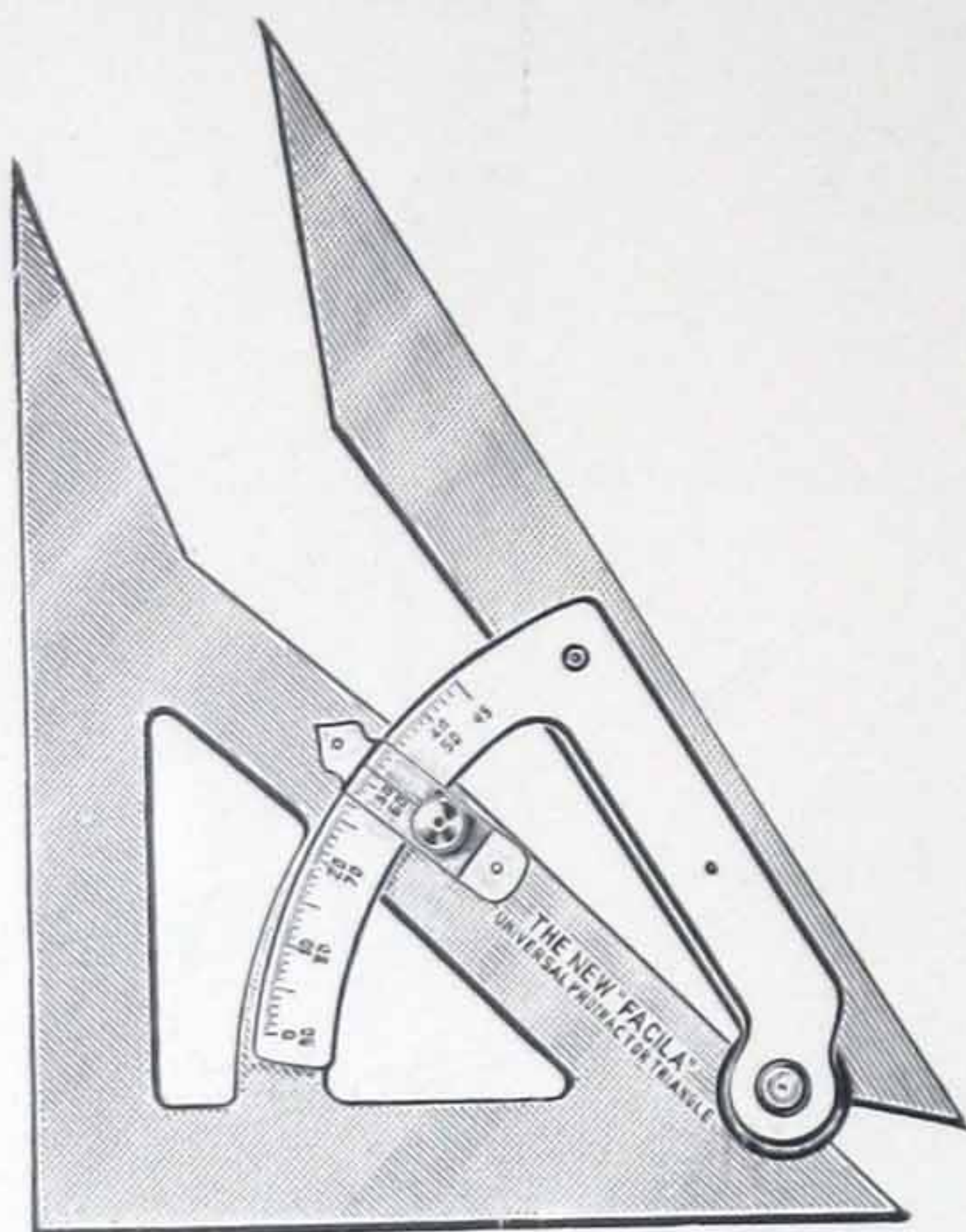
- | | | | | | |
|------------------|---------------------------------------|---------------|---|----|----|
| No. 3185. | Transparent Triangles, 30x60 degrees. | | | | |
| | Size, inches— | 8 | 9 | 10 | 12 |
| | Code Word..... | TASSEL | | | |
| No. 3186. | Transparent Triangles, 45 degrees. | | | | |
| | Size, inches— | 6 | 7 | 8 | 10 |
| | Code Word..... | TAZZA | | | |

When ordering by telegraph be sure to state SIZE in addition to Code Word.

SEE PRICE LIST IN BACK OF CATALOG

ADJUSTABLE TRIANGLES

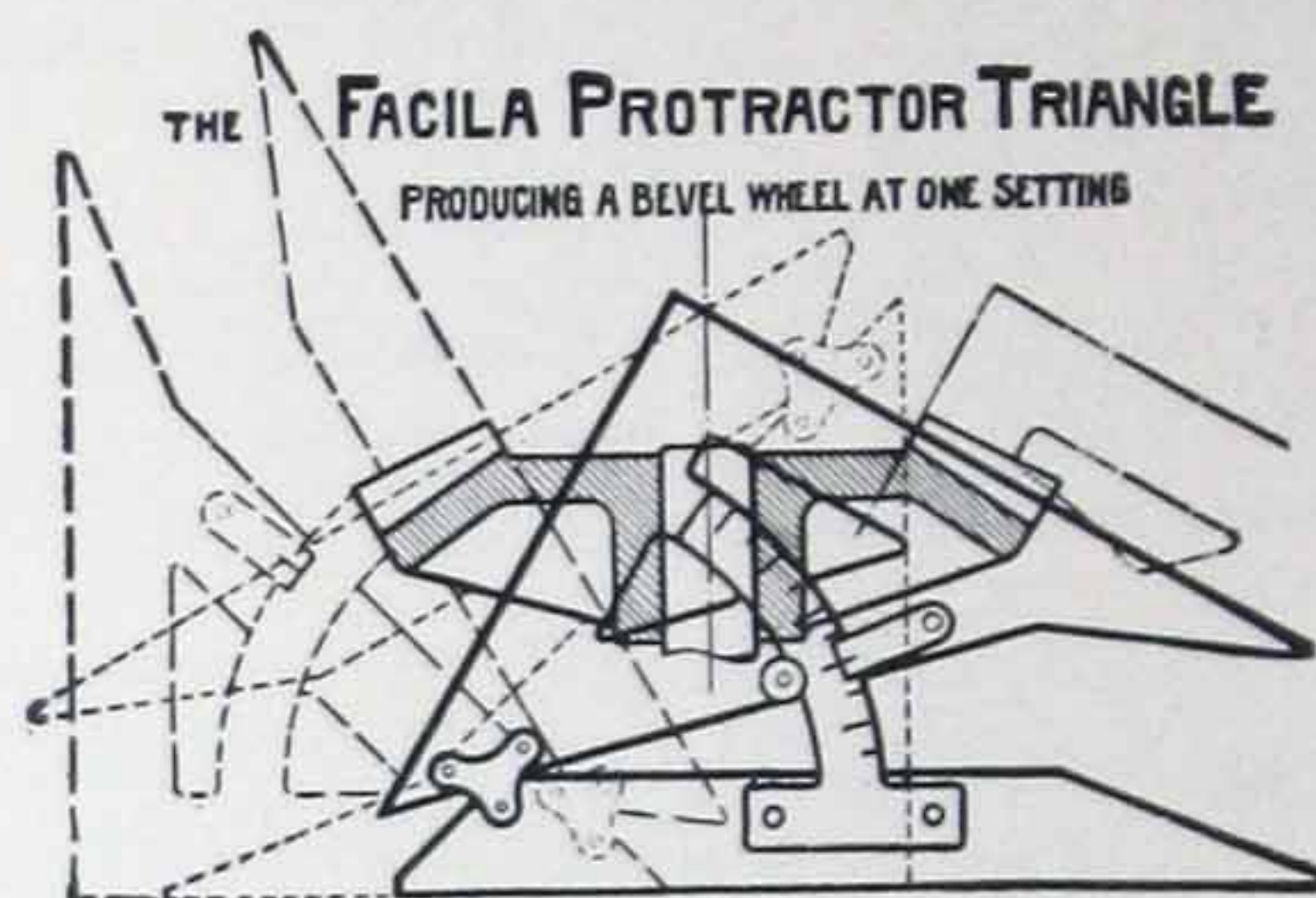
These adjustable angles are strongly made of heavy transparent celluloid. By means of an ivory grained celluloid protractor, engine divided to half degrees, any angle may be obtained and set with a metal clamp screw.



No. 3192A. Adjustable Triangle with 7" arm.
.....Code Word, **THANE**

No. 3192B. Adjustable Triangle with 10" arm.
Code Word, **THATCH**

No. 3192C. Adjustable Triangle with 12" arm.
Code Word, **THAW**



THE AMES LETTERING INSTRUMENT

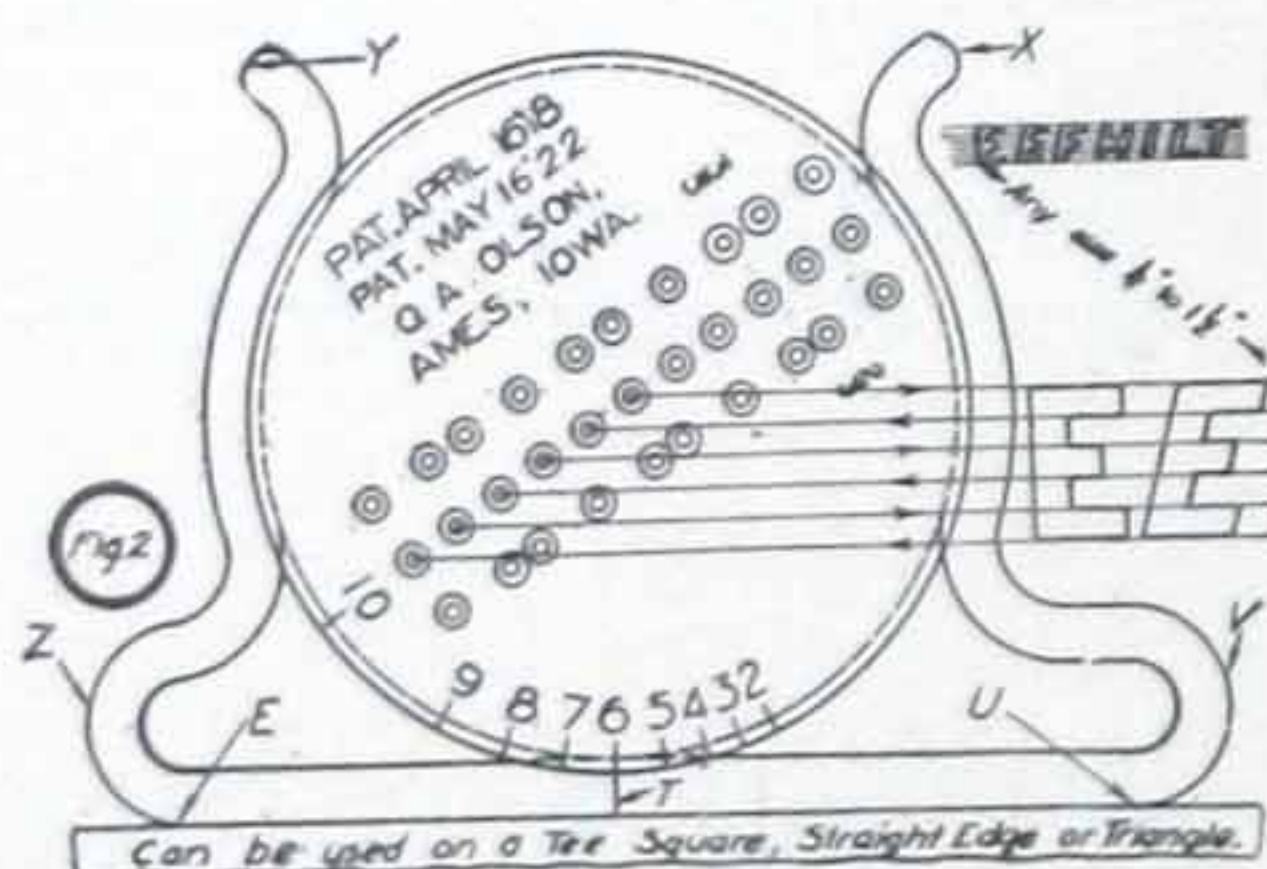


Fig. 1

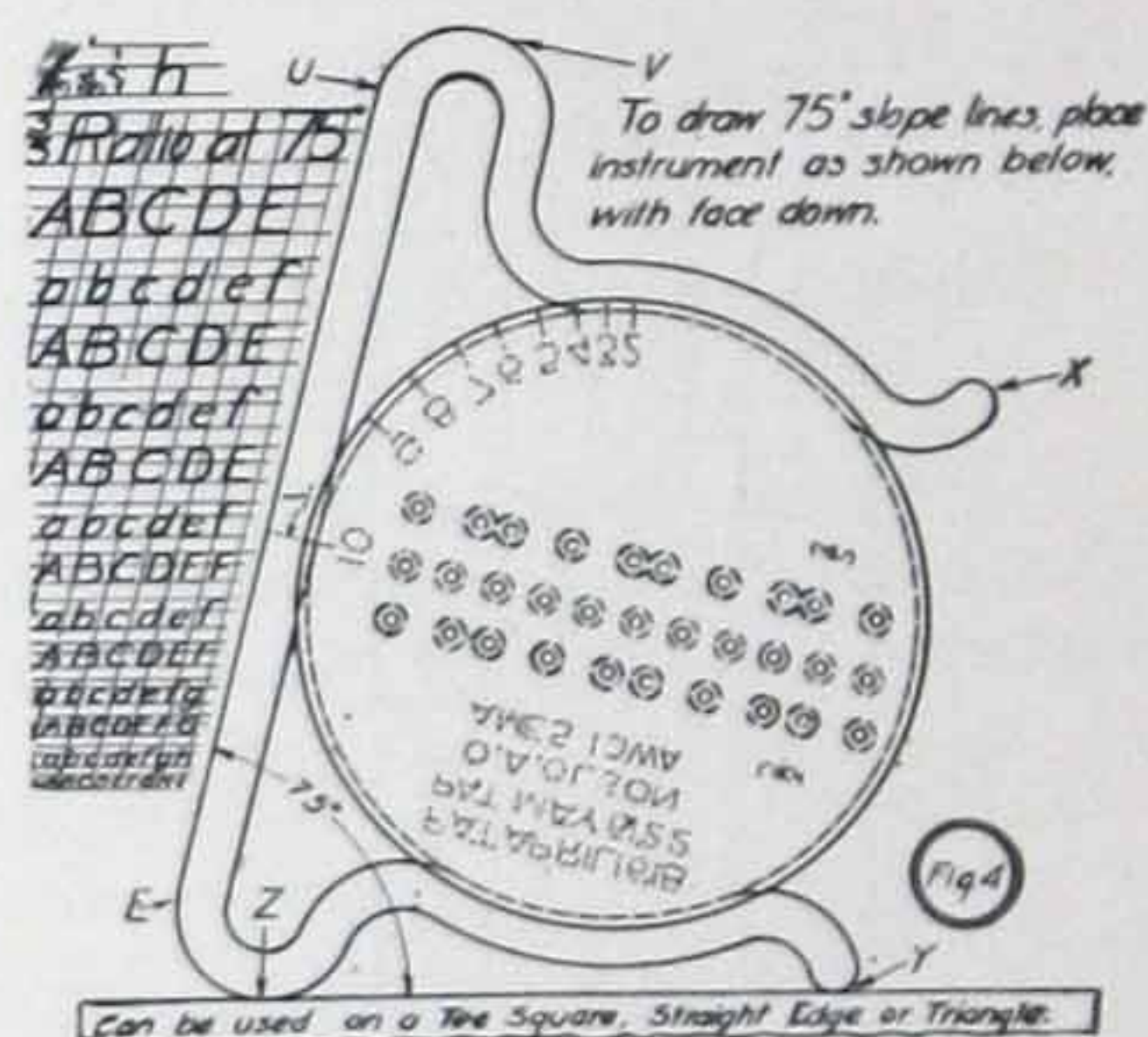


Fig. 3

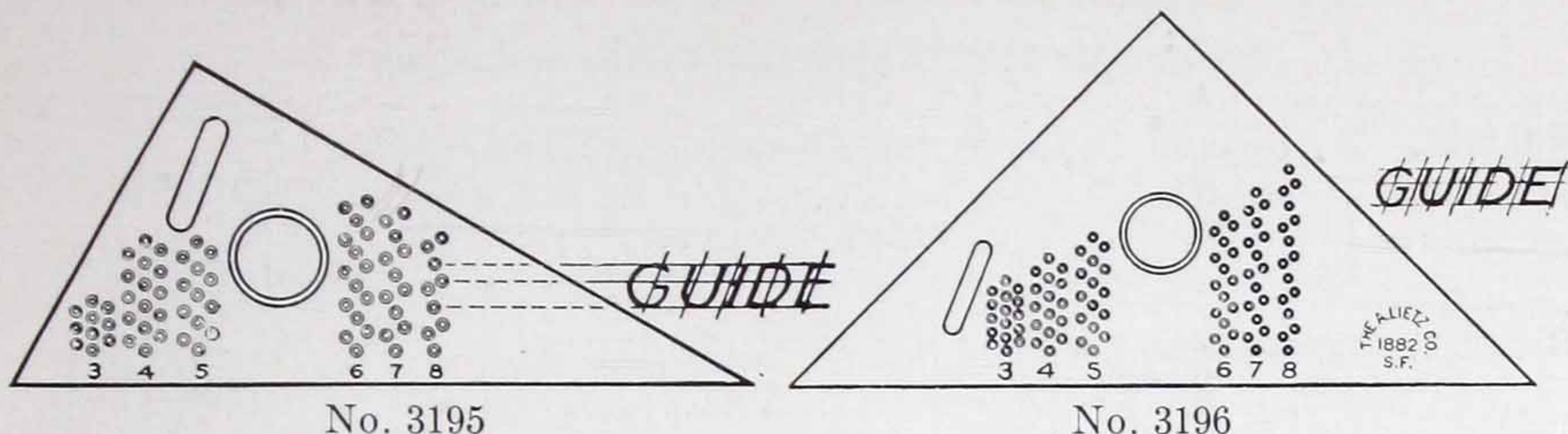
The Ames Lettering Instrument is the only instrument of its kind that has holes spaced for three different systems of guide lines. The vertical height between the guide lines may be regulated by swiveling the disc in the frame.

The AMES LETTERING INSTRUMENT is used for reducing the time consumed in placing guide lines on drawings when lettering titles and notes. This device consists of a nickel-plated, tempered steel frame, which retains a transparent celluloid disc that may be swiveled in the frame. The disc has three parallel rows of tapered holes, which furnish a means for quickly drawing guide lines without the necessity of first locating them by means of a scale. **Slanting lines** for letters may be quickly drawn by placing the instrument with the open and closed end in contact with the straightedge. (See Figure 3.)

No. 3194. Price of Ames Lettering Instrument....Code Word, **THECA**

SEE PRICE LIST IN BACK OF CATALOG

TRANSPARENT LETTERING ANGLES



No. 3195

No. 3196

Lettering angles are designed to give a quick and easy method of making accurately spaced guide lines for lettering of drawings. There are 6 columns of holes, the figure under each column denoting the height of the standard capital letters in thirty-seconds of an inch. Practically any desired spacing or guide lines may be obtained by inserting the pencil point through the proper series of holes and sliding the angle along the T-square. The $67\frac{1}{2}^\circ$ slot is useful for obtaining uniform slope lines. The beveled pick-up makes the lettering angle very easy to handle.

No. 3195. Transparent Lettering Angles, 30x60 degrees.

Size, inches—

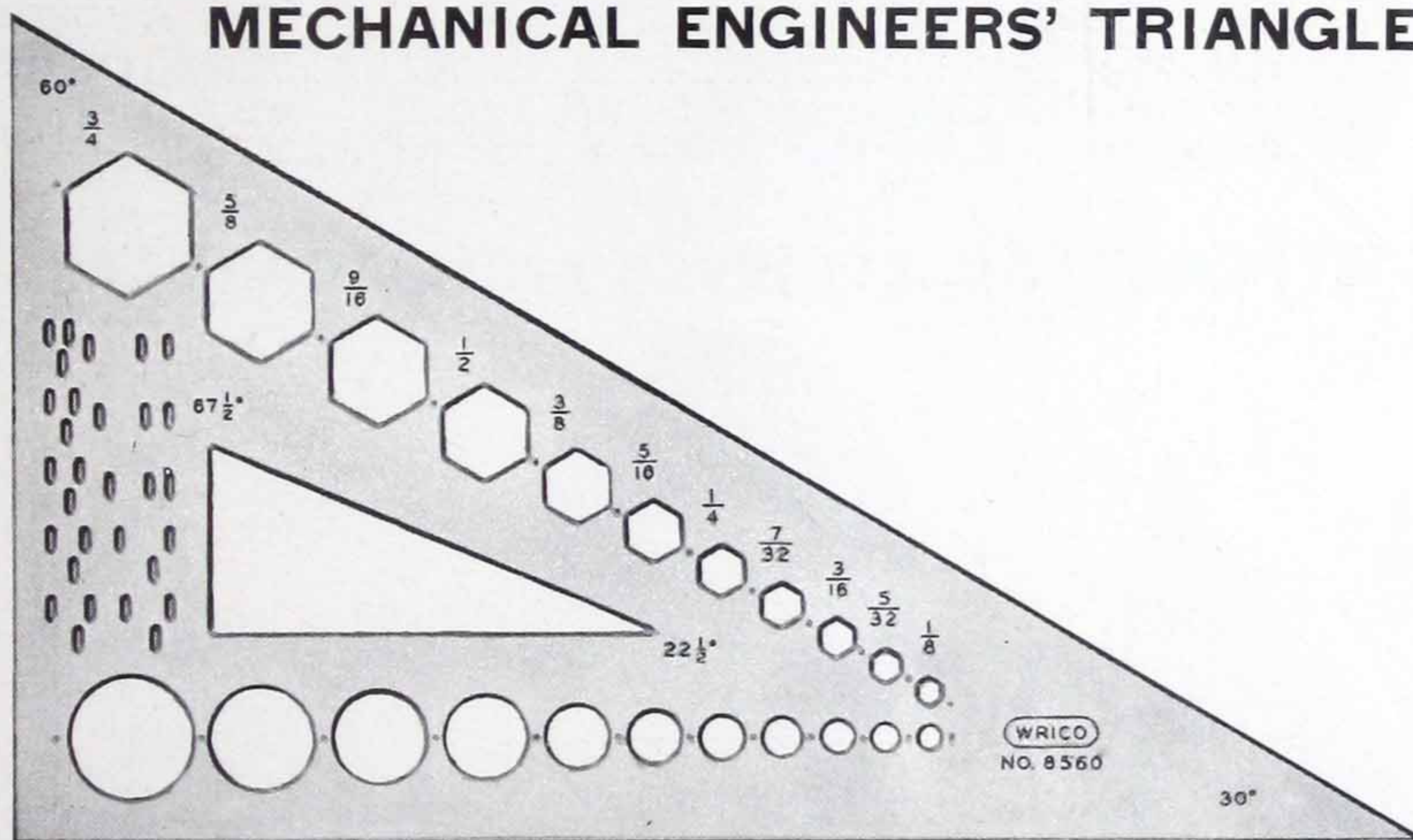
Code Word.....THEINE THELE THERM

No. 3196. Transparent Lettering Angles, 45 degrees.

Size, inches—

Code Word.....THILL THIVE THOLE

MECHANICAL ENGINEERS' TRIANGLES



No. 3197

Mechanical Engineers' Triangle, No. 3197, has a series of accurately machined circular and hexagonal beveled openings ranging in size from $\frac{1}{8}$ " to $\frac{3}{4}$ ". When using short side of the triangle against a straightedge, these openings are accurately aligned so that by moving the triangle along the straightedge the circles can be inscribed in the hexagons; and in this manner bolt heads, nuts, etc. can be quickly and accurately drawn; whereas concentric circles, washers or screw heads can be quickly made when using the long side of the triangle. There are also ten groups of beveled slots for obtaining guide lines for lettering and the inner hypotenuse represents a $67\frac{1}{2}^\circ$ angle for obtaining uniform slope line.

No. 3197. Transparent Celluloid Mechanical Engineers' Triangle, 30x60 degrees, 9".

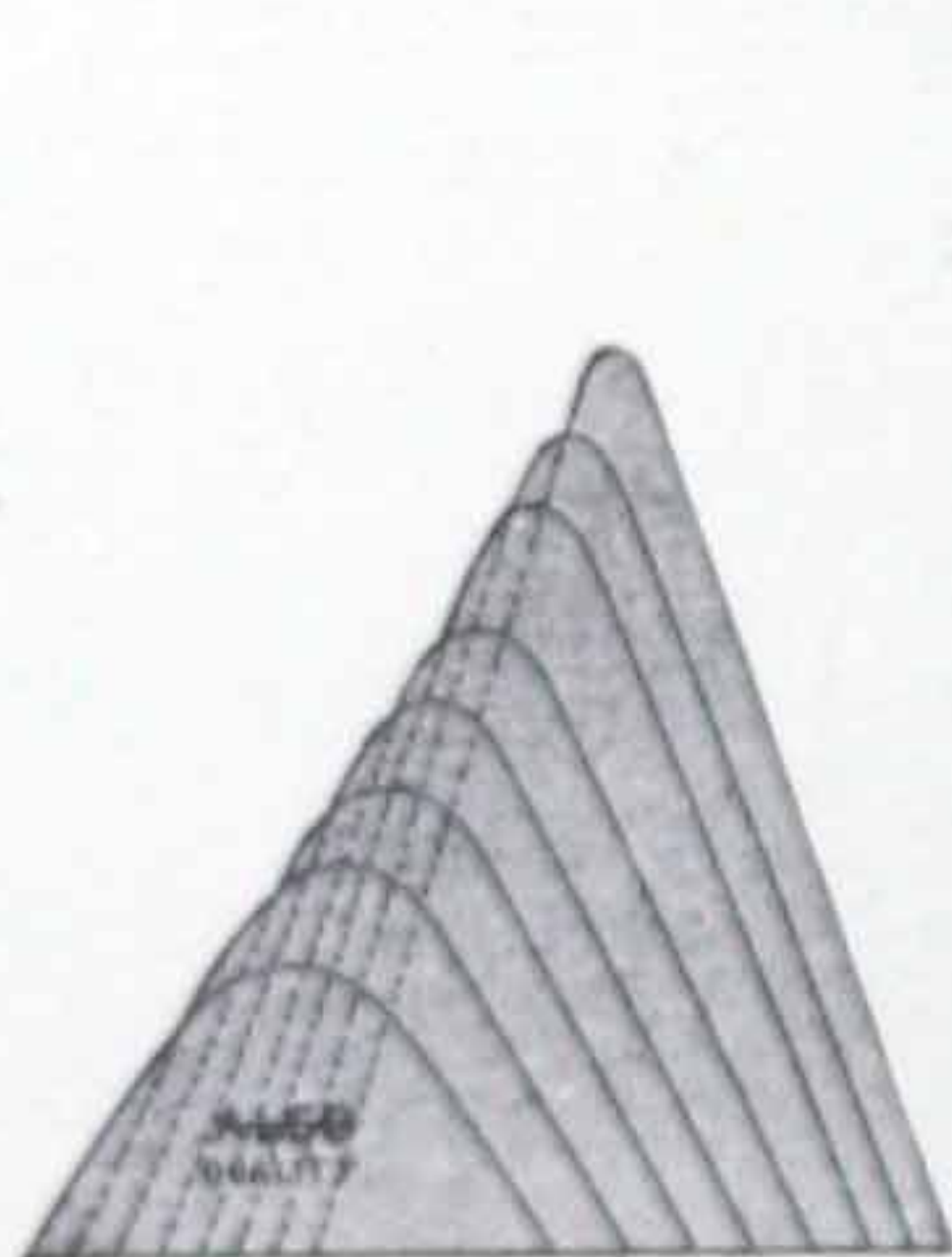
.....Code Word, **THOR**

CELLULOID IN SHEETS

Suitable for cutting your own curves and angles

- | | | Code Word |
|-----------|---|-----------------|
| No. 3220. | Transparent Celluloid, extra heavy, 80/1000 in. thick.
Full sheet, 20x50 inches.....
Per running inch, 20 inches wide.....
Per square inch, less than 20 inches wide..... | THRILLER |
| No. 3221. | Transparent Celluloid, heavy, 60/1000 in. thick.
Full sheet, 20x50 inches.....
Per running inch, 20 inches wide.....
Per square inch, less than 20 inches wide..... | THRIVER |
| No. 3222. | Transparent Celluloid, medium, 40/1000 in. thick.
Full sheet, 20x50 inches.....
Per running inch, 20 inches wide.....
Per square inch, less than 20 inches wide..... | THRONE |
| No. 3223. | Transparent Celluloid, extra thin and flexible, 10/1000 in. thick.
Full sheet, 20x50 inches.....
Per running inch, 20 inches wide.....
Per square inch, less than 20 inches wide..... | THROSTLE |
| No. 3224. | Opaque White Photo Celluloid, polished one side only. Thin and flexible. 10/1000 in. thick.
Full sheet, 20x50 inches.....
Per running inch, 20 inches wide.....
Per square inch, less than 20 inches wide..... | THROTTLE |

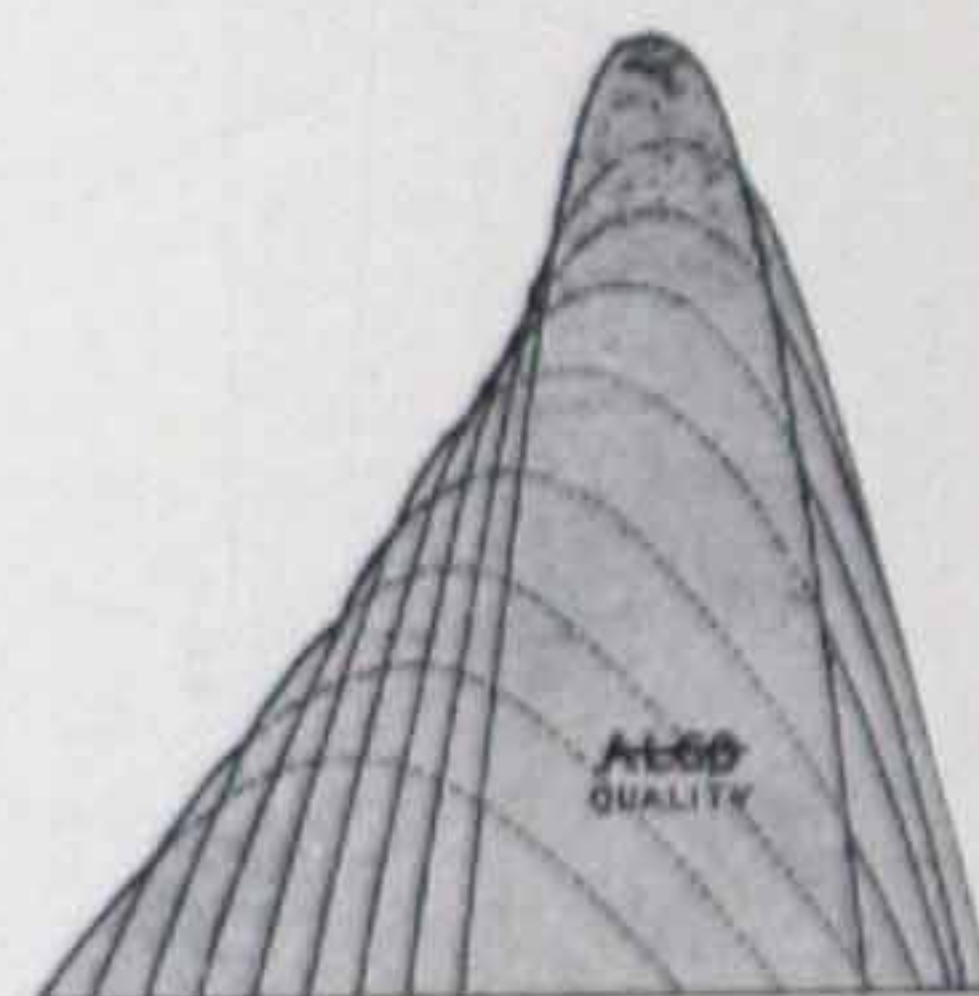
HYPERBOLAS, ELLIPSES AND PARABOLAS



No. 3230



No. 3232



No. 3234

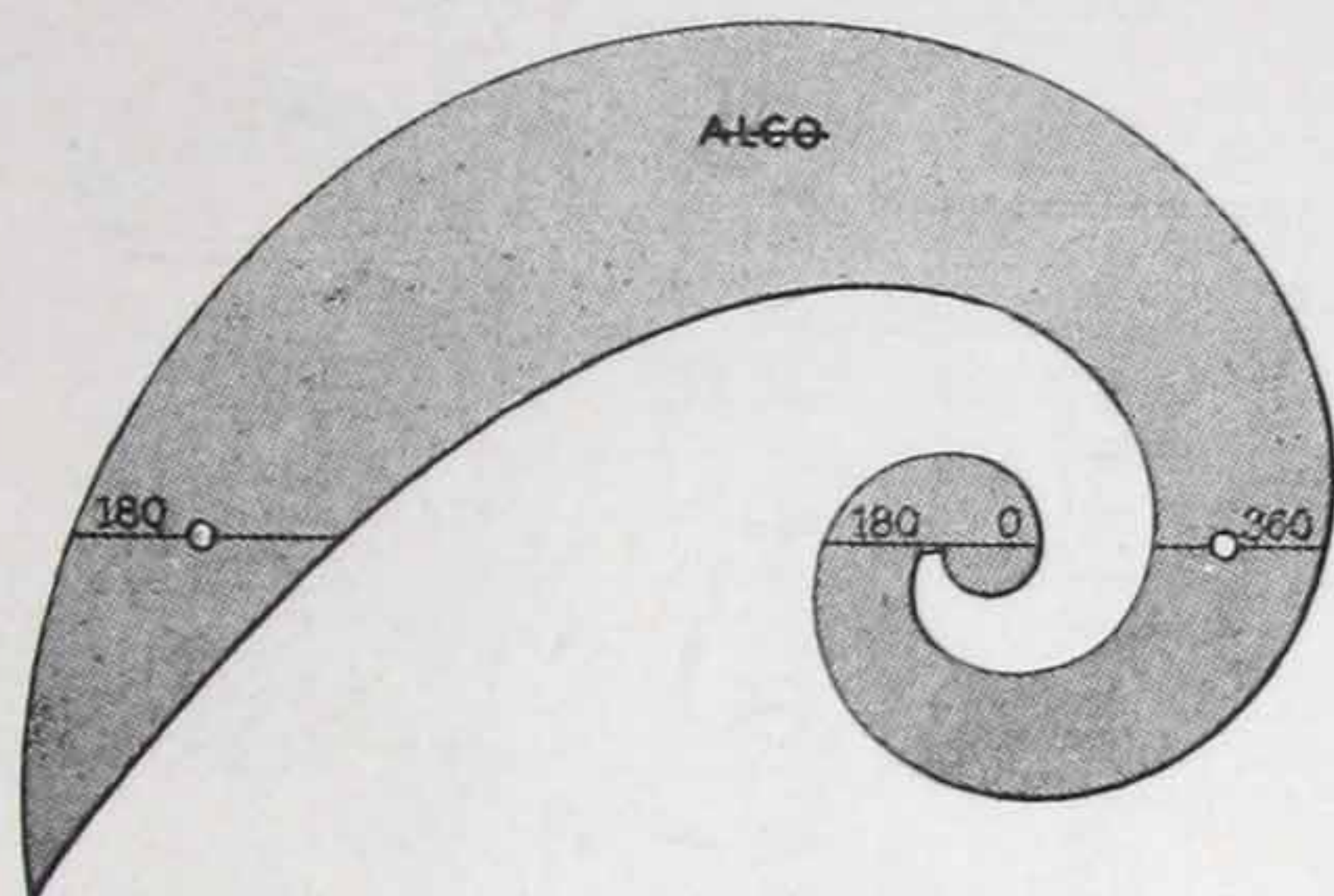
Transparent
Celluloid

- | | | Code Word |
|-----------|--|---------------|
| No. 3230. | Hyperbolas, 8 to set, 2 to 5½ inch..... | THRUM |
| No. 3232. | Ellipses, 10 to set, 1½ to 6 inches..... | THRUSH |
| No. 3233. | Parabolas, 8 to set, 1¼ to 5½ inches..... | THUG |
| No. 3234. | Parabolas, 8 to set, 3¼ to 14¼ inches..... | THULE |

SEE PRICE LIST IN BACK OF CATALOG

IRREGULAR CURVES

SPECIAL CURVES



No. 3240

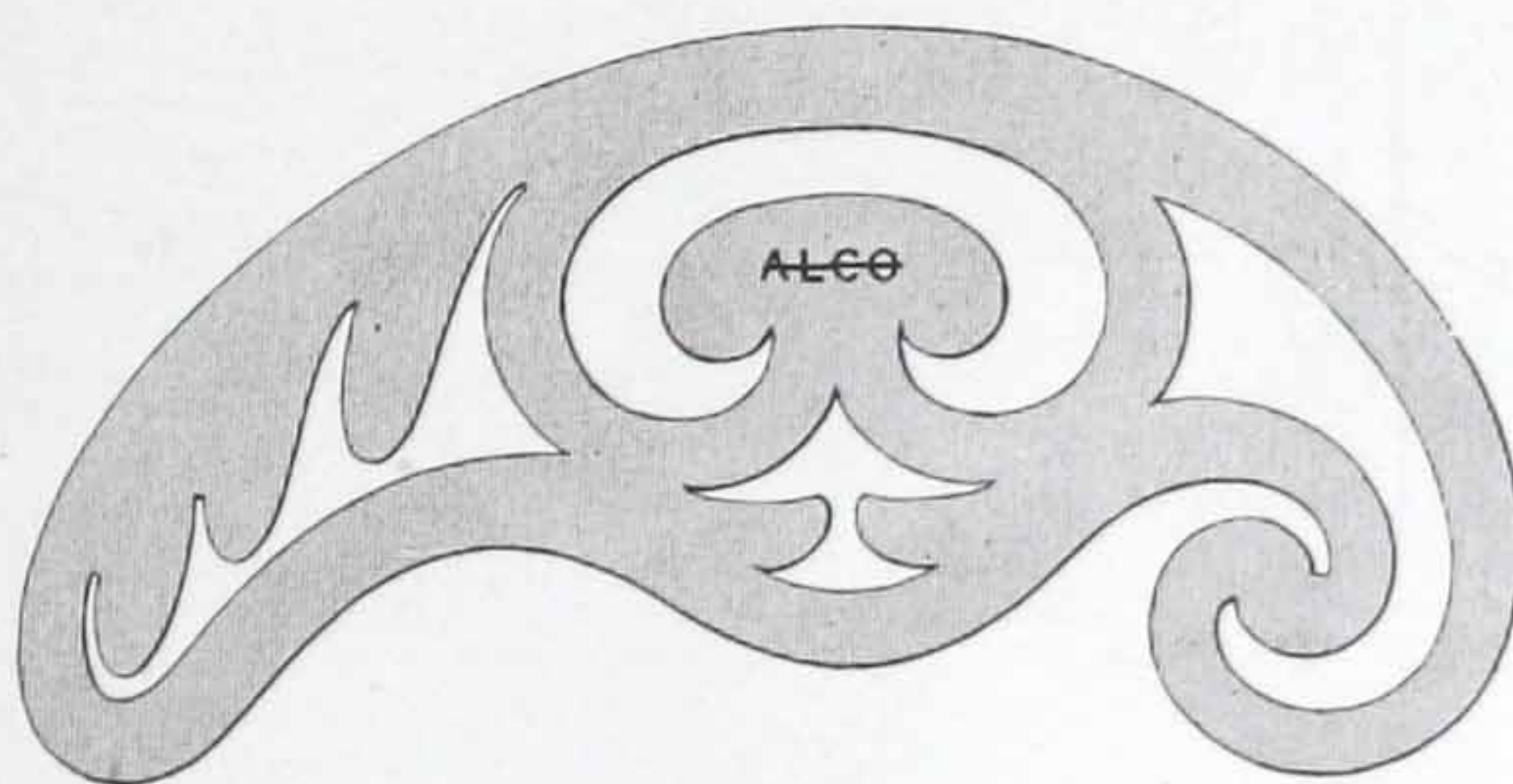


No. 3242

Code Word

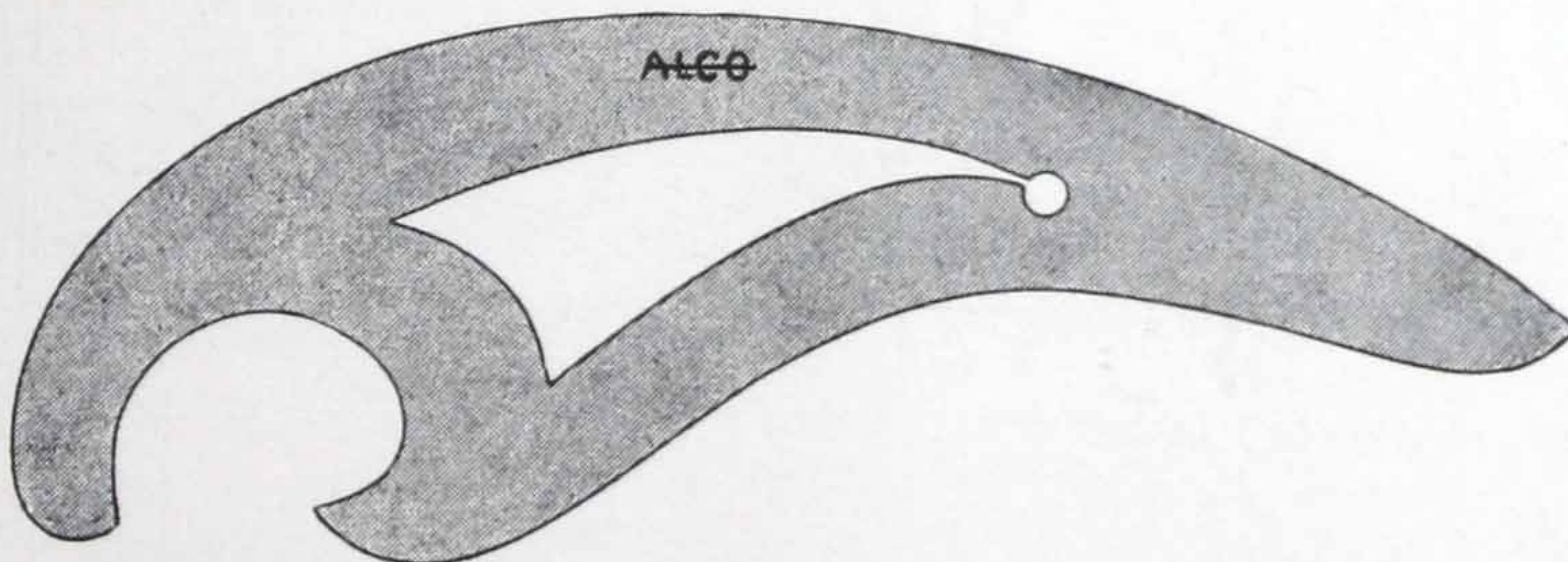
No. 3240. Logarithmic Spiral Curve, transparent celluloid. Each. **TIARA**

No. 3242. Combination Curve, transparent celluloid. Each. . . . **TIBIA**



No. 3244

No. 3244. Combination Curve, transparent celluloid. Each. . . . **TIDING**



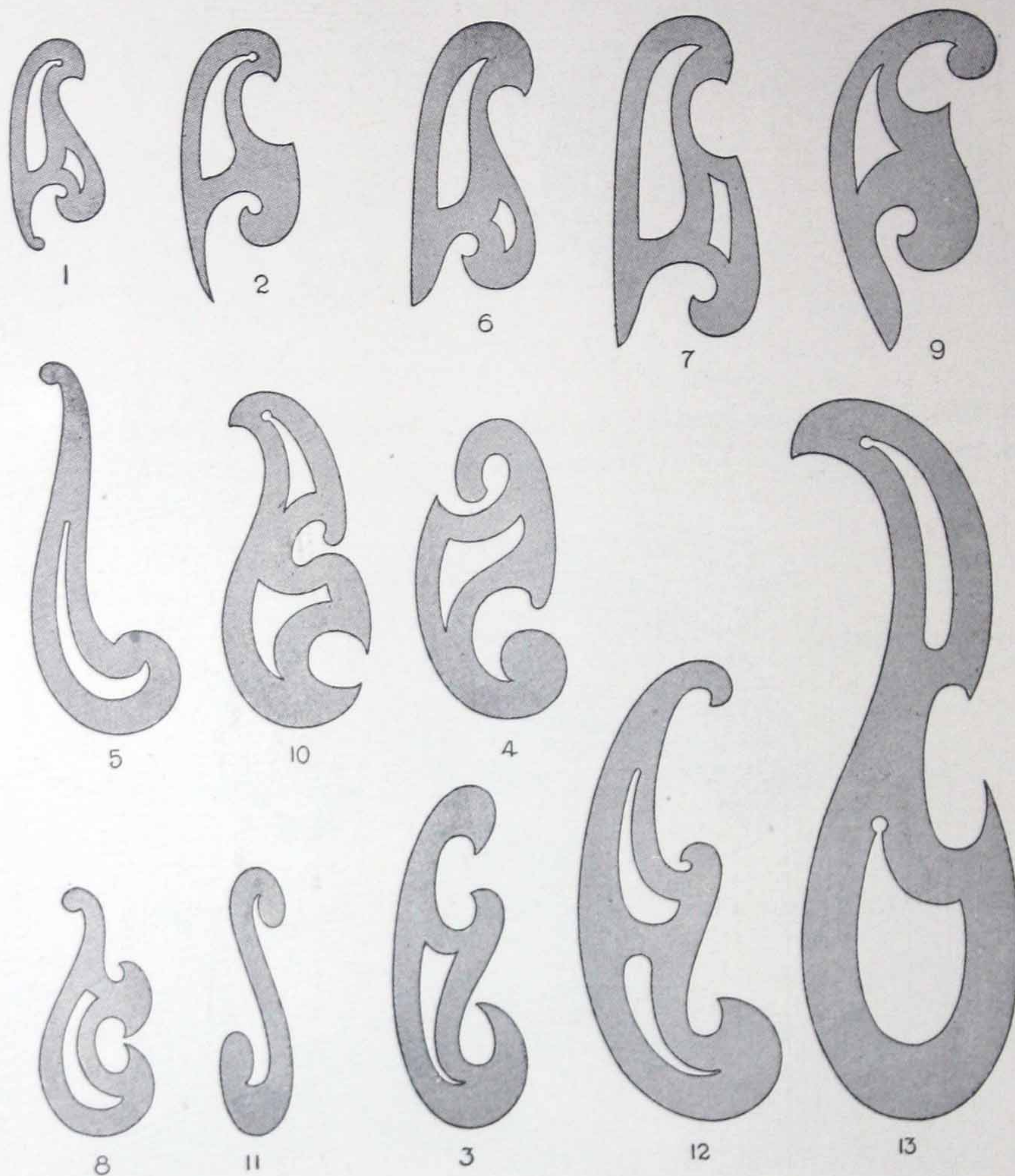
No. 3246

No. 3246. Aviation Curve, transparent celluloid. Each. **TIFFIN**

SEE PRICE LIST IN BACK OF CATALOG

IRREGULAR OR FRENCH CURVES

Made of Transparent Celluloid



No. 3251. Celluloid Curves—

Pattern No.....	1	2	3	4	5	6	7	8	9	10	11	12	13
Code Word.....	TIMIST												

When ordering by telegraph be sure to state PATTERN NUMBER in addition to Code Word.

SEE PRICE LIST IN BACK OF CATALOG

SPLINES

Made of Transparent Celluloid



No. 3256

No. 3256. Transparent Celluloid Splines, grooved.

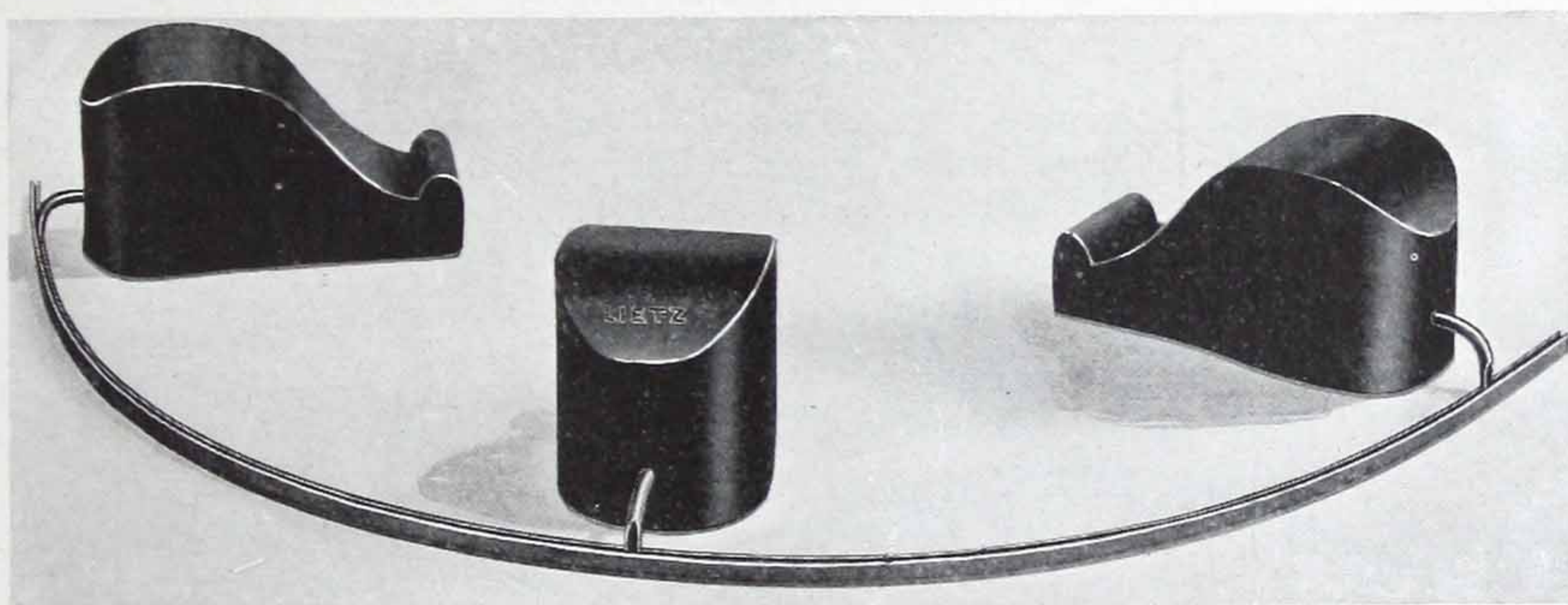
Length, inches—

24 30 36 42 48 60

Code Word.....**TOKAY**

When ordering by telegraph be sure to state LENGTH in addition to Code Word.

WEIGHTS FOR SPLINES



No. 3260

Code Word

No. 3260. Improved weights for Splines, with hook, 4 lbs.

Each.....**TOLA**

SET OF SPLINES AND SPLINE WEIGHTS

No. 3265. Set of Splines and Spline Weights, in strong wooden box containing: 1 each Transparent Celluloid Spline 18, 24, 30, 36, 42 and 48 inches; 4 Spline Weights No. 3260. Per set.....Code Word, **TOMIN**

SEE PRICE LIST IN BACK OF CATALOG

ADJUSTABLE CURVE RULERS

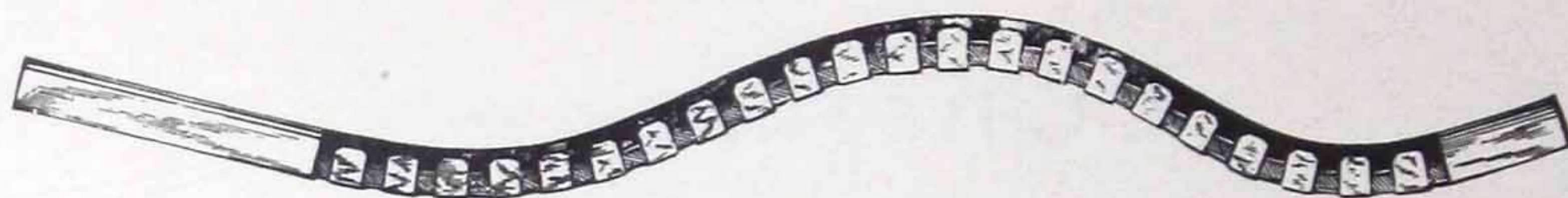


Nos. 3271-72



Code Word

- No. 3271.** Adjustable Curve Ruler, double edge, 15 in. long.
Each..... **TRAMMEL**
- No. 3272.** Adjustable Curve Ruler, double edge, 31 in. long.
Each..... **TRAMWAY**



No. 3278

- No. 3278.** Adjustable Curve Ruler, black rubber ruling edge,
14½ in. long. Each..... **TRANSUDE**
This is a similar tool to Nos. 3271-72, but of better quality.



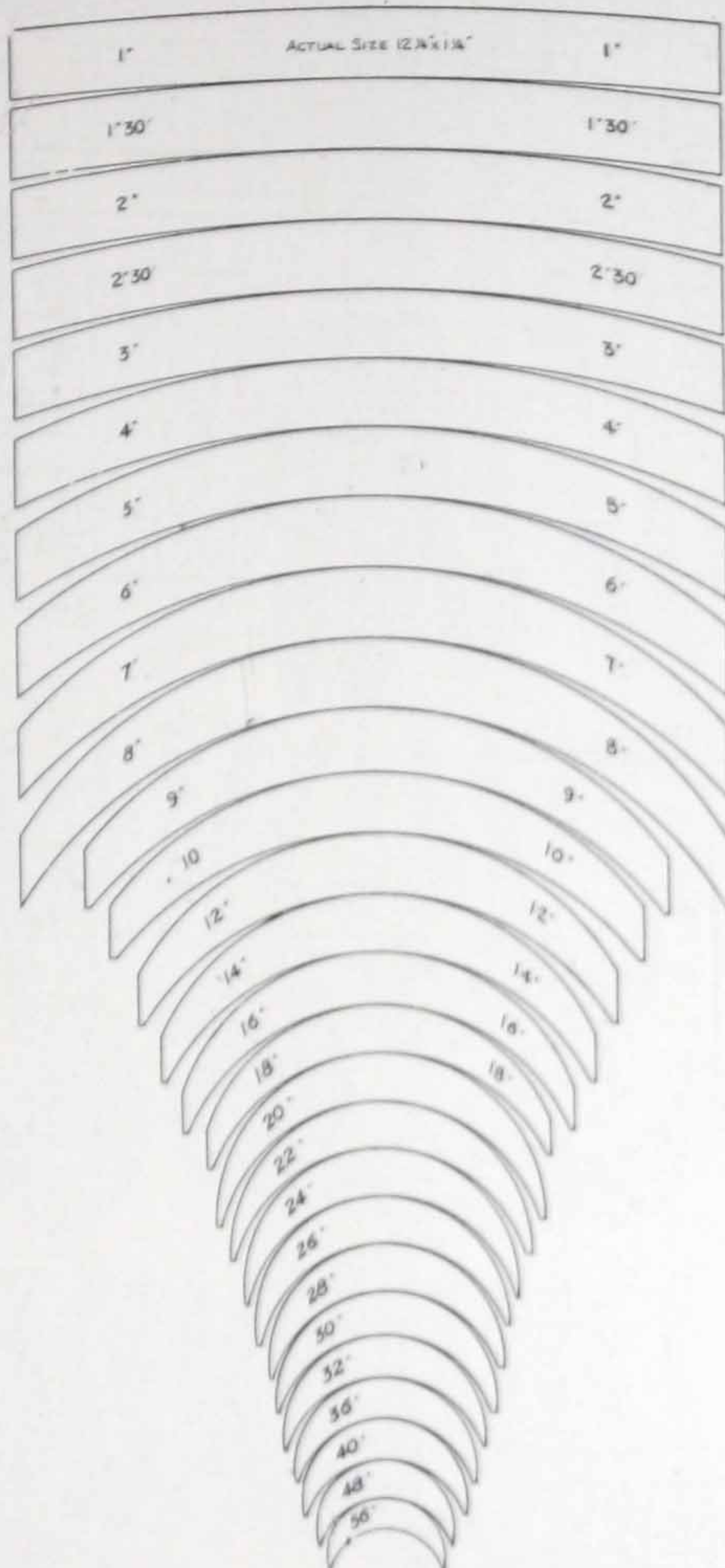
No. 3279

- No. 3279.** Adjustable Curve Ruler, steel ruling edge, 30 in.
long. Each..... **TRAPEZE**

The above rules can be instantly adjusted and retained to any form or curve. The working edge on rules Nos. 3271-78 is made of rubber and rounded, so that by slightly inclining the pencil or pen several parallel curves may be drawn without moving the ruler. Ruler No. 3279 has a square steel ruling edge.

SEE PRICE LIST IN BACK OF CATALOG

COLLINS CELLULOID CIRCULAR CURVES FOR HIGHWAY ENGINEERS



These curves
are also made
in even foot
radius sets,
or graduated
in inches.

These Curves
made to order
in any group
of radii
desired.

Collins Celluloid Circular Curves are accurately cut on the Harger & Bonney radius, which is 5730 feet for a 1° curve, and all others in direct proportion. All curves are cut to a scale of 1 inch=100 feet and are designated by degrees as shown by illustration.

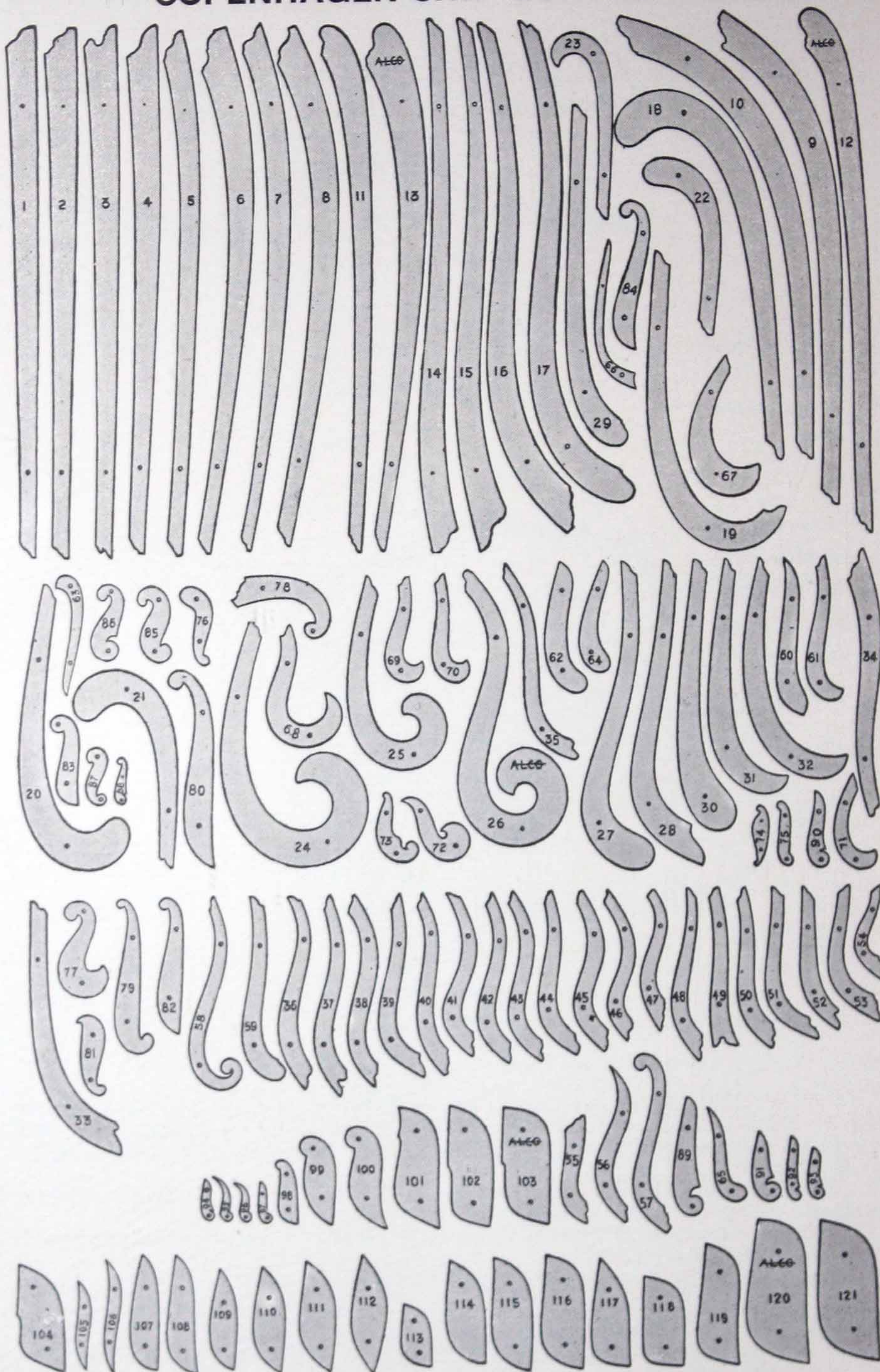
They are invaluable for projecting on topography, and for platting and inking purposes, practically eliminating the use of a beam compass.

This set consists of 27 Curves, which cover all practical requirements and needs in Highway Engineering.

No. 3285. Set of 27 Transparent Celluloid Highway Curves, in mahogany box.
.....Code Word, **TREFOIL**

No. 3286. Set of 30 Collins Highway Curves, made of transparent celluloid, in even foot radii as follows: 5000, 4000, 3000, 2500, 2000, 1500, 1200, 1000, 850, 800, 750, 700, 650, 600, 550, 500, 450, 400, 375, 350, 325, 300, 275, 250, 225, 200, 175, 150, 125, 100 feet.Code Word, **TREGER**

COPENHAGEN SHIP CURVES



Illustrations about one-ninth size.

No. 3290. Transparent Celluloid Copenhagen Ship Curves.....

For prices see opposite page.

COPENHAGEN SHIP CURVES

No. 3290

Made of Transparent Celluloid

Pattern No.	Pattern No.	Pattern No.	Pattern No.
1	32*	62	92
2*	33*	63	93
3	34	64*	94
4*	35*	65	95
5	36*	66	96
6*	37	67	97
7	38	68*	98
8*	39*	69	99*
9	40	70	100*
10*	41	71	101*
11	42	72*	102
12	43	73	103
13*	44*	74	104
14	45	75	105
15*	46	76	106
16	47	77*	107*
17*	48*	78	108
18*	49	79	109
19	50	80	110*
20*	51*	81	111
21	52*	82	112
22	53*	83*	113
23*	54	84*	114*
24	55	85*	115
25*	56	86	116
26	57*	87	117
27	58	88	118*
28	59*	89*	119*
29*	60*	90	120
30*	61	91*	121*
31			

When ordering please state both catalog and pattern number.

Code Word

No. 3290A. Set of 45 transparent celluloid Ship Curves, containing one each curve of patterns marked * above. In hardwood case. Per set.....**TRELLIS**

No. 3290B. Set of 121 transparent celluloid Ship Curves, containing one each curve No. 1 to 121. In hardwood case. Per set.....**TREMOLO**

SPECIAL CURVES MADE TO ORDER

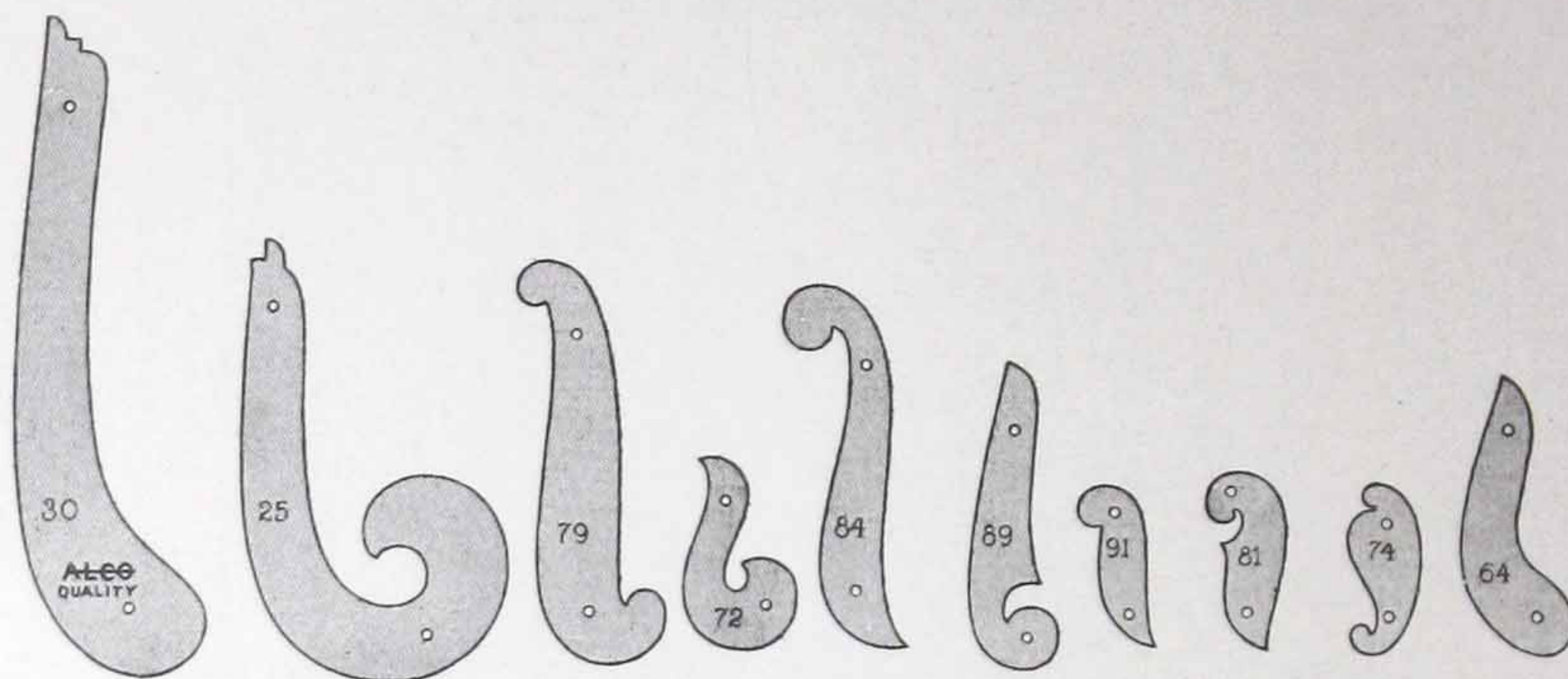
We are prepared to manufacture to order special curves of any description. Work of this character is solicited by us and we will gladly furnish prices on special orders.

SEE PRICE LIST IN BACK OF CATALOG

CURVES FOR MECHANICAL ENGINEERS

Made of Transparent Celluloid

In Sets



No. 3295

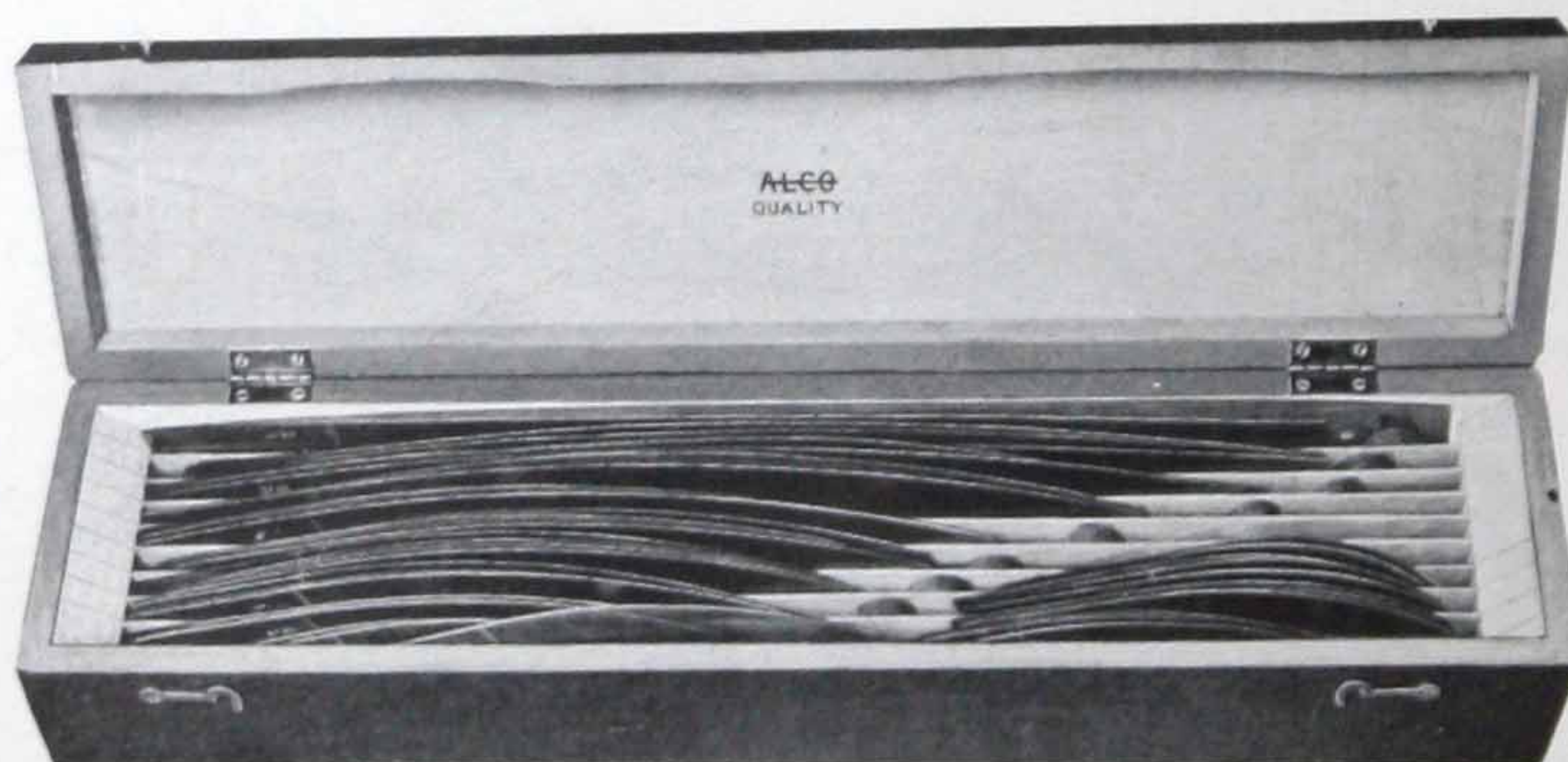
No. 3295. Set of 10 Transparent Curves, for Mechanical Engineers,, containing one each curve of patterns numbers 25, 30, 64, 72, 74, 79, 84, 89, 91 and 98, as listed under No. 3290 on page 339. In wooden box.
Per set.....Code Word, **TREPAN**

RAILROAD CURVES

Made of Transparent Celluloid, Pearwood, Metal, and Cardboard.

With and without tangent.

These Curves are of the best workmanship and material. They are true and circular, and are the same on both edges, so that either edge may be used.



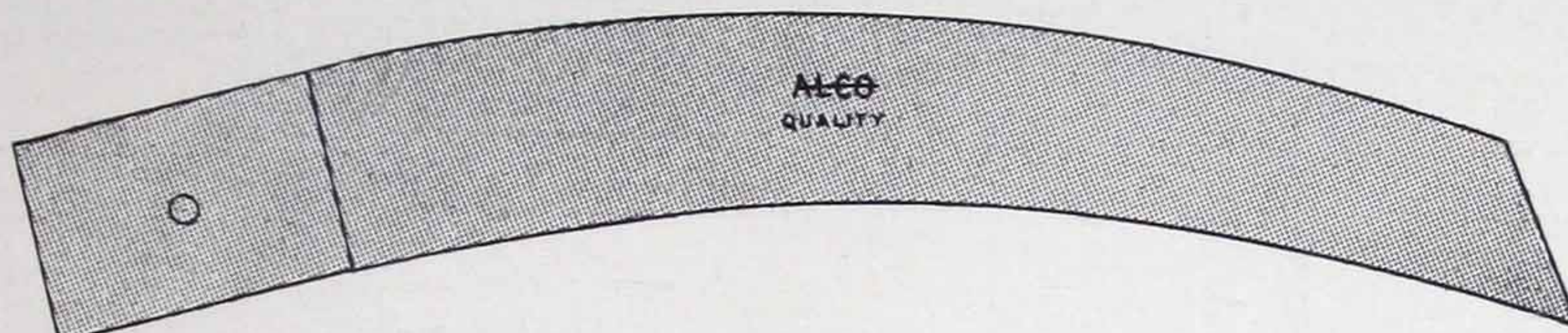
No. 3307

For description and price list see opposite page.

SEE PRICE LIST IN BACK OF CATALOG

TRANSPARENT RAILROAD CURVES

With Tangent



Sets are put up in polished mahogany boxes with partitions, which are plainly marked with the value of the curve contained. Thus the required curve is easily picked out, and the chances of bending or warping the curves are entirely eliminated.

No. 3300. Transparent Railroad Curves, with tangent, set of 55 curves, viz.: 3, 3½, 4, 4½, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 32, 34, 35, 36, 38, 40, 45, 50, 55, 60, 65, 70, 75, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200 inches radius, in wooden box with partitions. Per set..... **TREPHINE**

Code Word

No. 3305. Transparent Railroad Curves, with tangent, marked in degrees and inches, to scale 100 feet=1 inch, set of 41 curves, viz.:

0°.30' = 114.59 in.	3°.30' = 16.37 in.	6°.15' = 9.17 in.	9°.00' = 6.37 in.
1°.00' = 57.30 in.	3°.45' = 15.28 in.	6°.30' = 8.82 in.	9°.15' = 6.20 in.
1°.15' = 45.84 in.	4°.00' = 14.33 in.	6°.45' = 8.49 in.	9°.30' = 6.04 in.
1°.30' = 38.20 in.	4°.15' = 13.48 in.	7°.00' = 8.19 in.	9°.45' = 5.88 in.
1°.45' = 32.74 in.	4°.30' = 12.73 in.	7°.15' = 7.91 in.	10°.00' = 5.74 in.
2°.00' = 28.65 in.	4°.45' = 12.07 in.	7°.30' = 7.64 in.	10°.30' = 5.48 in.
2°.15' = 25.47 in.	5°.00' = 11.46 in.	7°.45' = 7.40 in.	11°.00' = 5.22 in.
2°.30' = 22.92 in.	5°.15' = 10.92 in.	8°.00' = 7.17 in.	11°.30' = 4.99 in.
2°.45' = 20.84 in.	5°.30' = 10.42 in.	8°.15' = 6.95 in.	
3°.00' = 19.10 in.	5°.45' = 9.97 in.	8°.30' = 6.75 in.	
3°.15' = 17.63 in.	6°.00' = 9.55 in.	8°.45' = 6.55 in.	

In wooden box with partitions. Per set..... **TRESSEL**

No. 3307. Transparent Railroad Curves, with tangent, marked in degrees and inches to scale 100 feet=1 inch, set of 55 curves, viz.:

0°.15' = 229.18 in.	3°.45' = 15.28 in.	7°.15' = 7.91 in.	11°.30' = 4.99 in.
0°.30' = 114.59 in.	4°.00' = 14.33 in.	7°.30' = 7.64 in.	12°.00' = 4.78 in.
0°.45' = 76.39 in.	4°.15' = 13.48 in.	7°.45' = 7.40 in.	12°.30' = 4.59 in.
1°.00' = 57.30 in.	4°.30' = 12.73 in.	8°.00' = 7.17 in.	13°.00' = 4.42 in.
1°.15' = 45.84 in.	4°.45' = 12.07 in.	8°.15' = 6.95 in.	13°.30' = 4.25 in.
1°.30' = 38.20 in.	5°.00' = 11.46 in.	8°.30' = 6.75 in.	14°.00' = 4.10 in.
1°.45' = 32.74 in.	5°.15' = 10.92 in.	8°.45' = 6.55 in.	14°.30' = 3.96 in.
2°.00' = 28.65 in.	5°.30' = 10.42 in.	9°.00' = 6.37 in.	15°.00' = 3.83 in.
2°.15' = 25.47 in.	5°.45' = 9.97 in.	9°.15' = 6.20 in.	16°.00' = 3.59 in.
2°.30' = 22.92 in.	6°.00' = 9.55 in.	9°.30' = 6.04 in.	17°.00' = 3.38 in.
2°.45' = 20.84 in.	6°.15' = 9.17 in.	9°.45' = 5.88 in.	18°.00' = 3.20 in.
3°.00' = 19.10 in.	6°.30' = 8.82 in.	10°.00' = 5.74 in.	19°.00' = 3.03 in.
3°.15' = 17.63 in.	6°.45' = 8.49 in.	10°.30' = 5.48 in.	20°.00' = 2.88 in.
3°.30' = 16.37 in.	7°.00' = 8.19 in.	11°.00' = 5.22 in.	

In wooden box, with partitions. Per set..... **TRIABLE**

No. 3307A. Separate Transparent Railroad Curves, with tangent.
Each.....

Railroad Curves of any desired scale cut to order.

SEE PRICE LIST IN BACK OF CATALOG

TRANSPARENT RAILROAD CURVES

Without tangent



Code Word

No. 3311. Transparent Railroad Curves, without tangent, set of 17 curves, viz.: 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57, 60 inches radius, in wooden box. Per set..... **TRIBASIC**

No. 3312. Transparent Railroad Curves, without tangent, set of 24 curves, viz.: 2, 2½, 3, 3½, 4, 4½, 5, 5½, 6, 6½, 7, 7½, 8, 8½, 9, 9½, 10, 12, 14, 16, 18, 20, 22, 24 inches radius, in wooden box. Set..... **TRIBRACH**

No. 3313. Transparent Railroad Curves, without tangent, set of 43 curves, viz.: 3½, 4, 4½, 5, 5½, 6, 6½, 7, 7½, 8, 8½, 9, 9½, 10, 12, 14, 16, 18, 20, 22, 24, 27, 30, 33, 36, 39, 42, 48, 54, 60, 66, 72, 78, 84, 90, 100, 110, 120, 130, 140, 160, 180, 200 inches radius, in wooden box. Per set..... **TRIBUNE**

No. 3313A. Separate Transparent Railroad Curves, without Tangent. Each.....

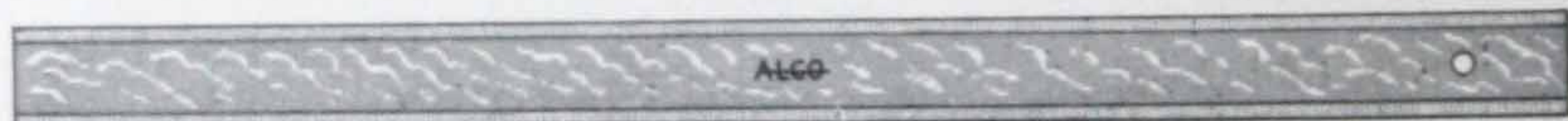
STRAIGHTEDGES

Lietz wooden straightedges are carefully made of the finest materials, thoroughly seasoned and they will stand up under most severe conditions.



No. 3350

No. 3350. **CHERRY STRAIGHTEDGES**, one edge beveled.
Size, inches..... 18 24 30 36 42 48 60
Code Word..... **TRIONAL**



No. 3356

No. 3356. **MAPLE TRANSPARENT CELLULOID LINED STRAIGHTEDGES**.
Size, inches..... 18 24 30 36 42 48 54 60 72
Code Word..... **TRIEME**

SEE PRICE LIST IN BACK OF CATALOG

STAINLESS STEEL STRAIGHT EDGES



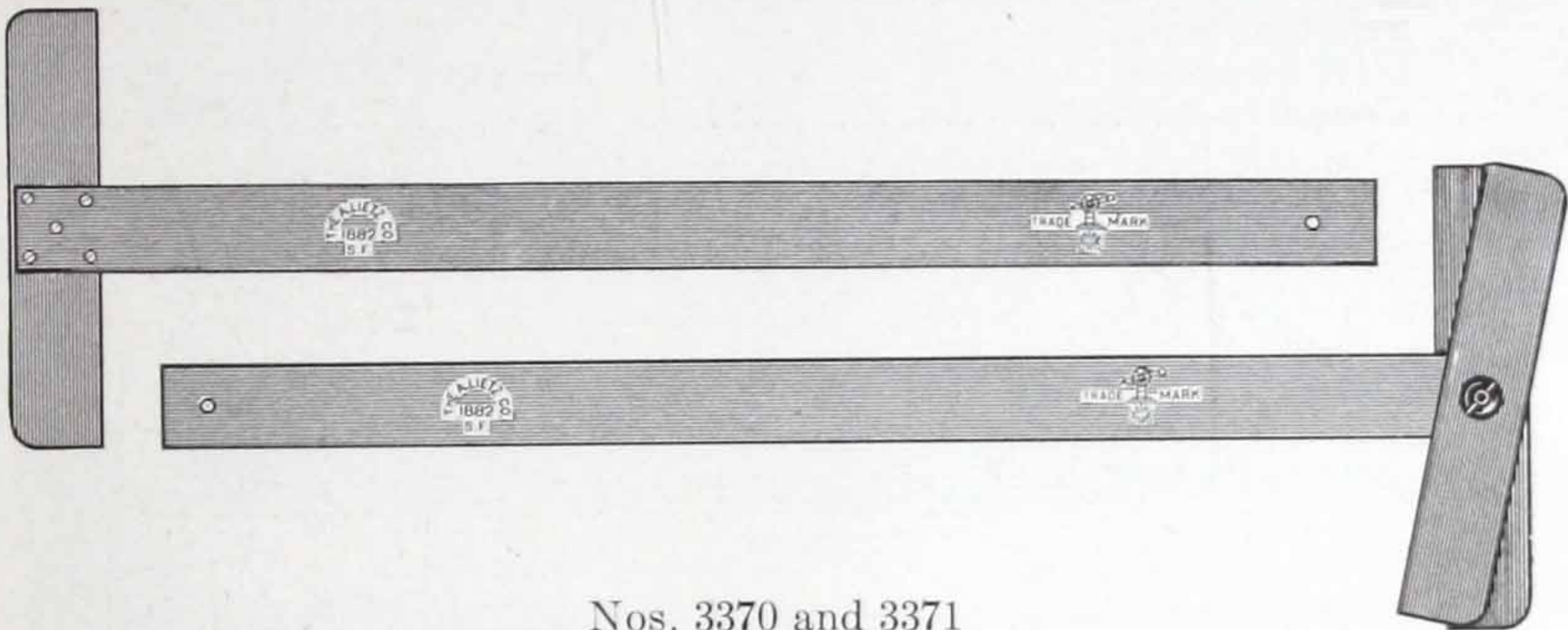
No. 3358

No. 3358.	STAINLESS STEEL STRAIGHT EDGES, one edge beveled.									
Size, inches.....	15	18	24	30	36	42	48	60	72	
Width, inches.....	1 3/8	1 3/8	1 3/8	2	2	2 1/2	2 1/2	3	3	
Thickness, inches.....	.07	.07	.07	.09	.09	.09	.09	.09	.09	
Code Word.....	TRIUNE									

When ordering by telegraph be sure to state LENGTH in addition to Code Word.

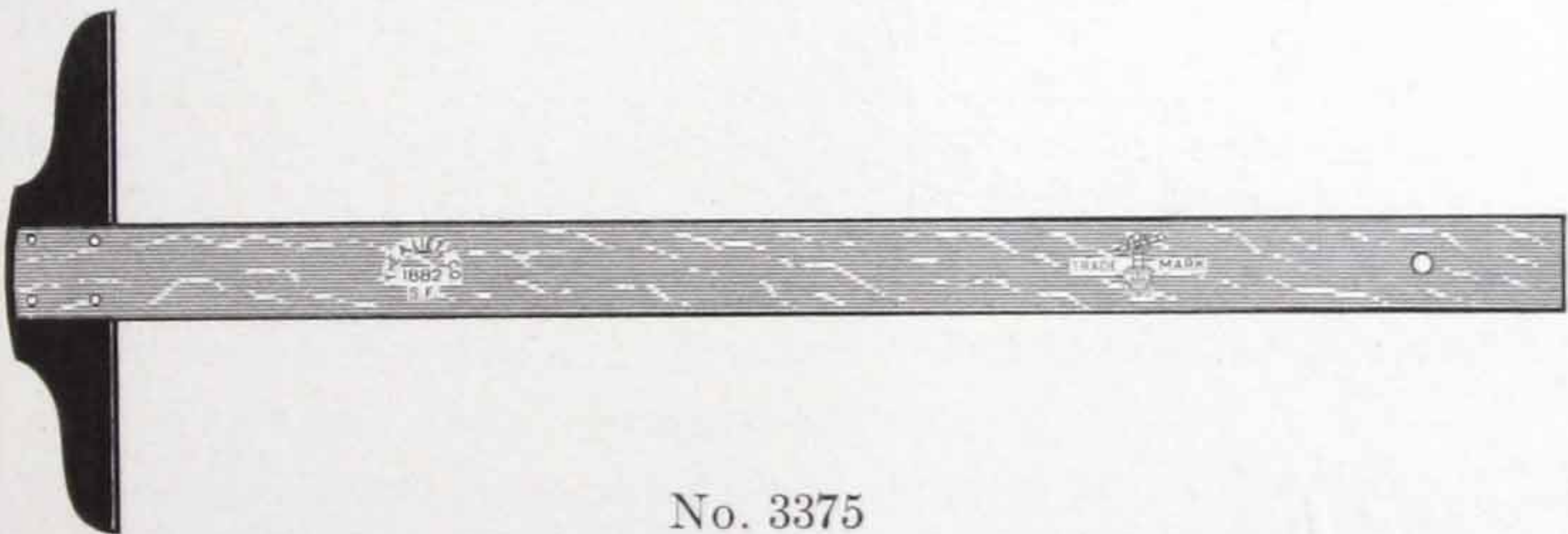
WOODEN T-SQUARES

Made in our own factory of the finest materials, carefully selected and thoroughly seasoned. Each T Square stamped with trade mark, our guaranty of quality.



Nos. 3370 and 3371

No. 3370.	Hardwood, plain blade, fixed head.								
Size, inches—		15	18	21	24	30	36		
Code Word.....		TROLLEY							
No. 3371.	Hardwood, plain blade, shifting head.								
Size, inches—					24	30	36		
Code Word.....		TROLLOP							



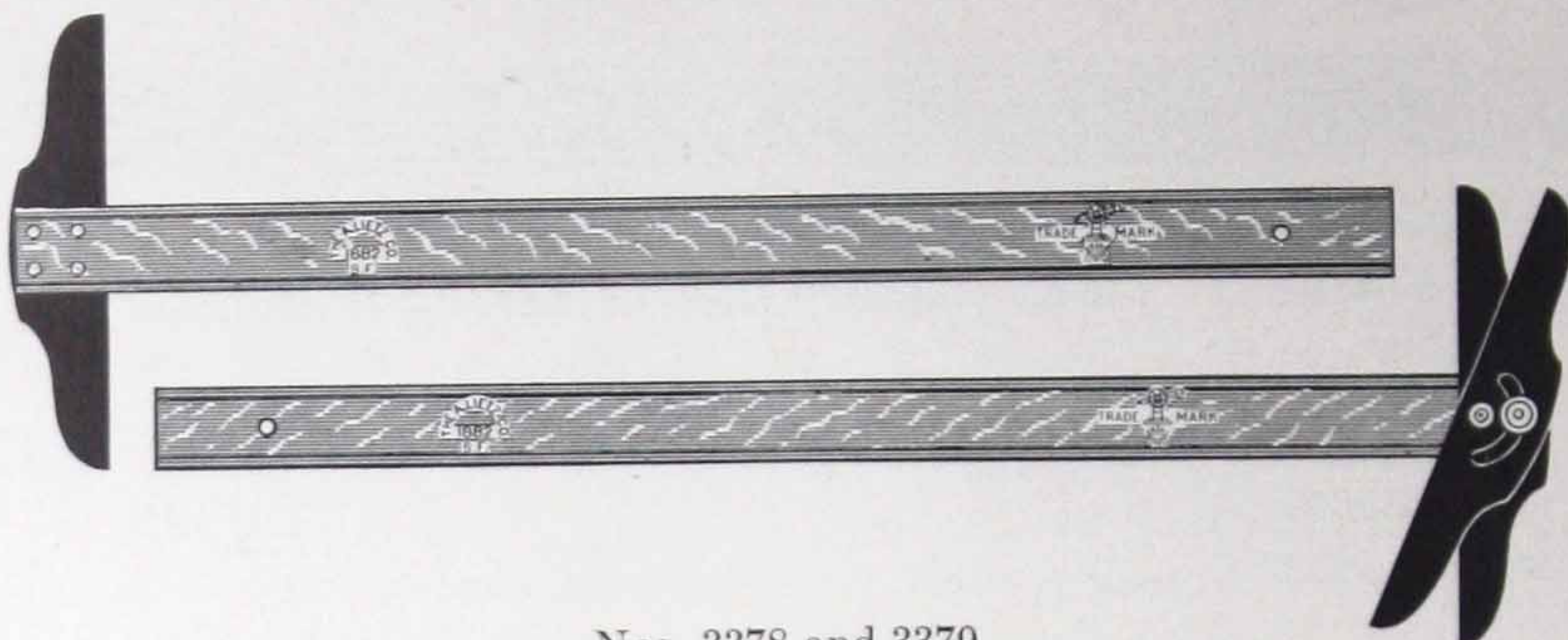
No. 3375

No. 3375.	Maple Blade, fixed head, ebony finish.						
Size, inches—		18	24	30	36	42	
Code Word.....		TROUT					

When ordering by telegraph be sure to state SIZE in addition to Code Word.

SEE PRICE LIST IN BACK OF CATALOG

WOODEN T-SQUARES



Nos. 3378 and 3379

- No. 3378.

Ash, Maple lined blade, fixed head, ebony finish.

Size, inches—
18
24
30
36
42
48
60
72

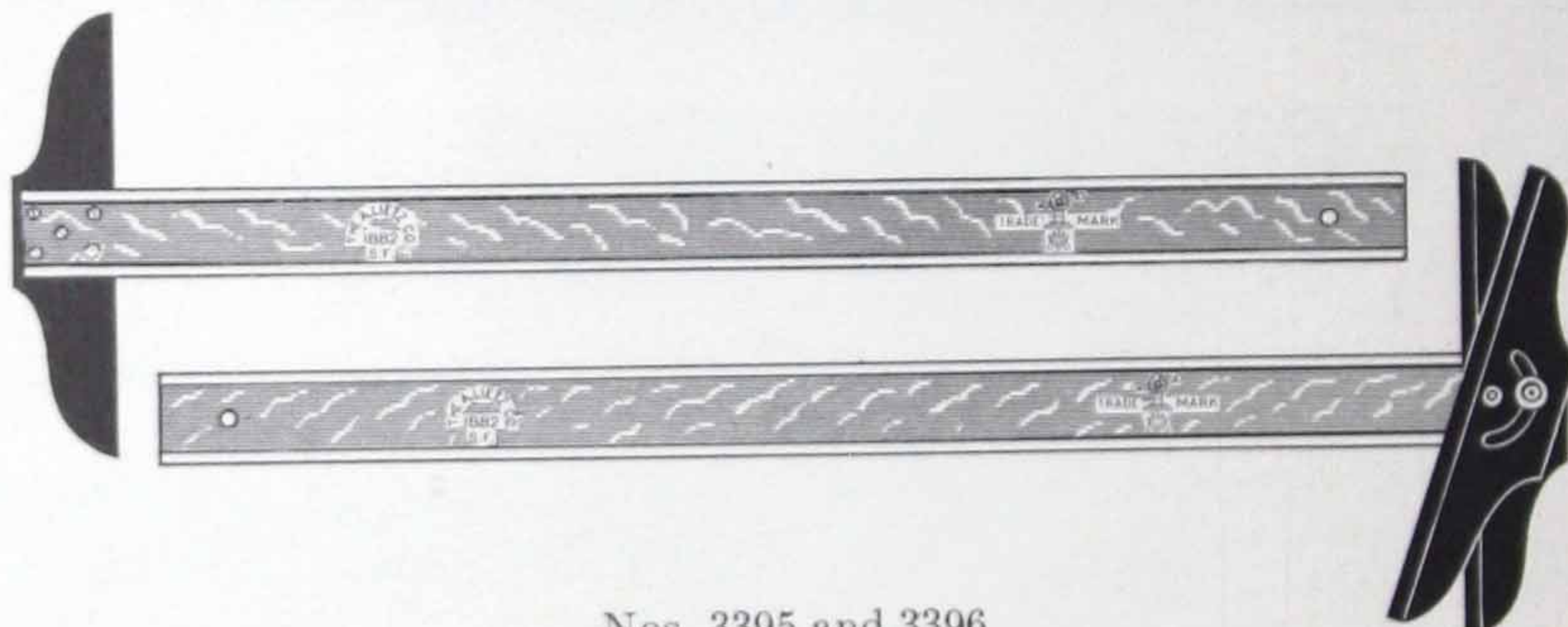
Code Word.....TROVER
- No. 3379.

Ash, Maple lined blade, shifting head, ebony finish, with two fine brass milled swivels.

Size, inches—
24
30
36
42
48
60
72

Code Word.....TRUCK

TRANSPARENT LINED T-SQUARES



Nos. 3395 and 3396

Best Quality

- No. 3395.

Maple, transparent celluloid lined blade, fixed head, ebony finish.

Size, inches—
15
18
24
30
36
42
48
54
60
72

Code Word.....TUBER
- No. 3396.

Maple, transparent celluloid lined blade, shifting head, ebony finish, with two fine brass milled swivels.

Size, inches—
15
18
24
30
36
42
48
54
60
72

Code Word.....TULIP

Note: The 15 and 18-inch T-Squares have only one brass swivel.

School Quality

- No. 3397.

Maple, transparent celluloid lined blade, fixed head, ebony finish.

Size, inches—
18
24
30
36

Code Word.....TUNDRA
- No. 3398.

Maple, transparent celluloid lined blade, shifting head, ebony finish.

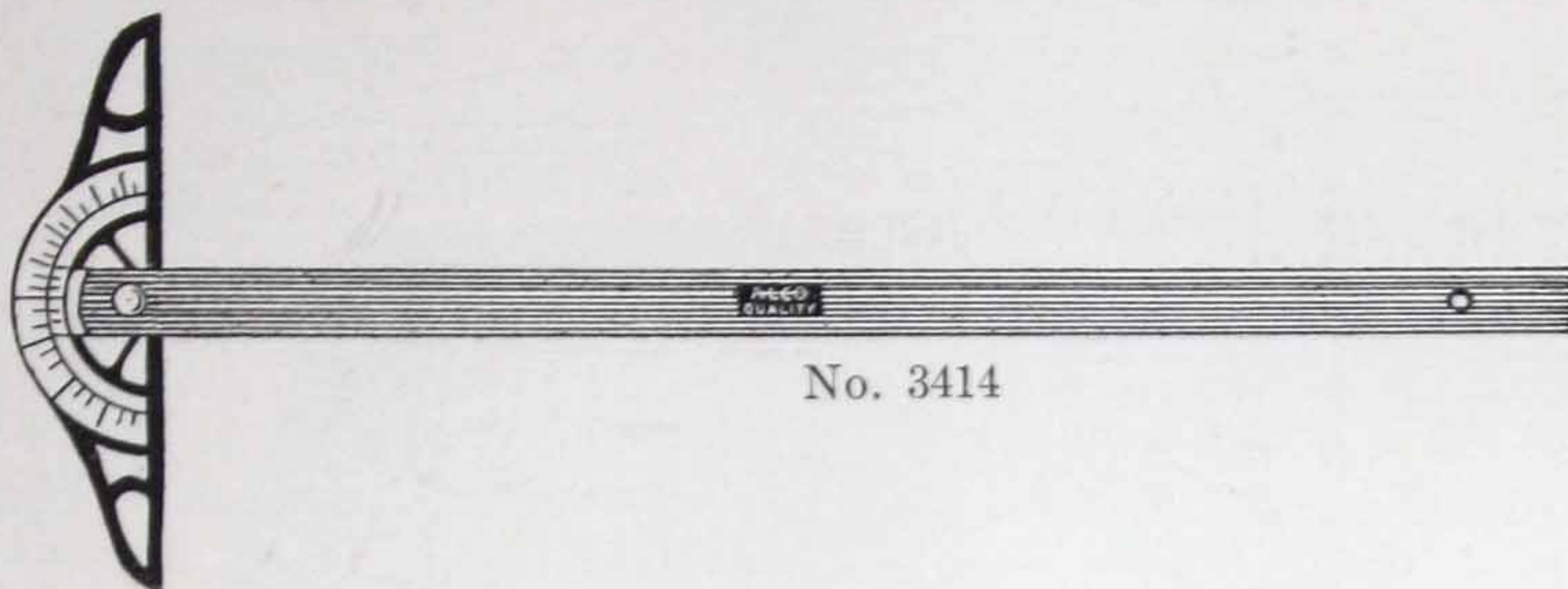
Size, inches—
18
24
30
36

Code Word.....TURBAN

When ordering by telegraph be sure to state SIZE in addition to Code Word.

SEE PRICE LIST IN BACK OF CATALOG

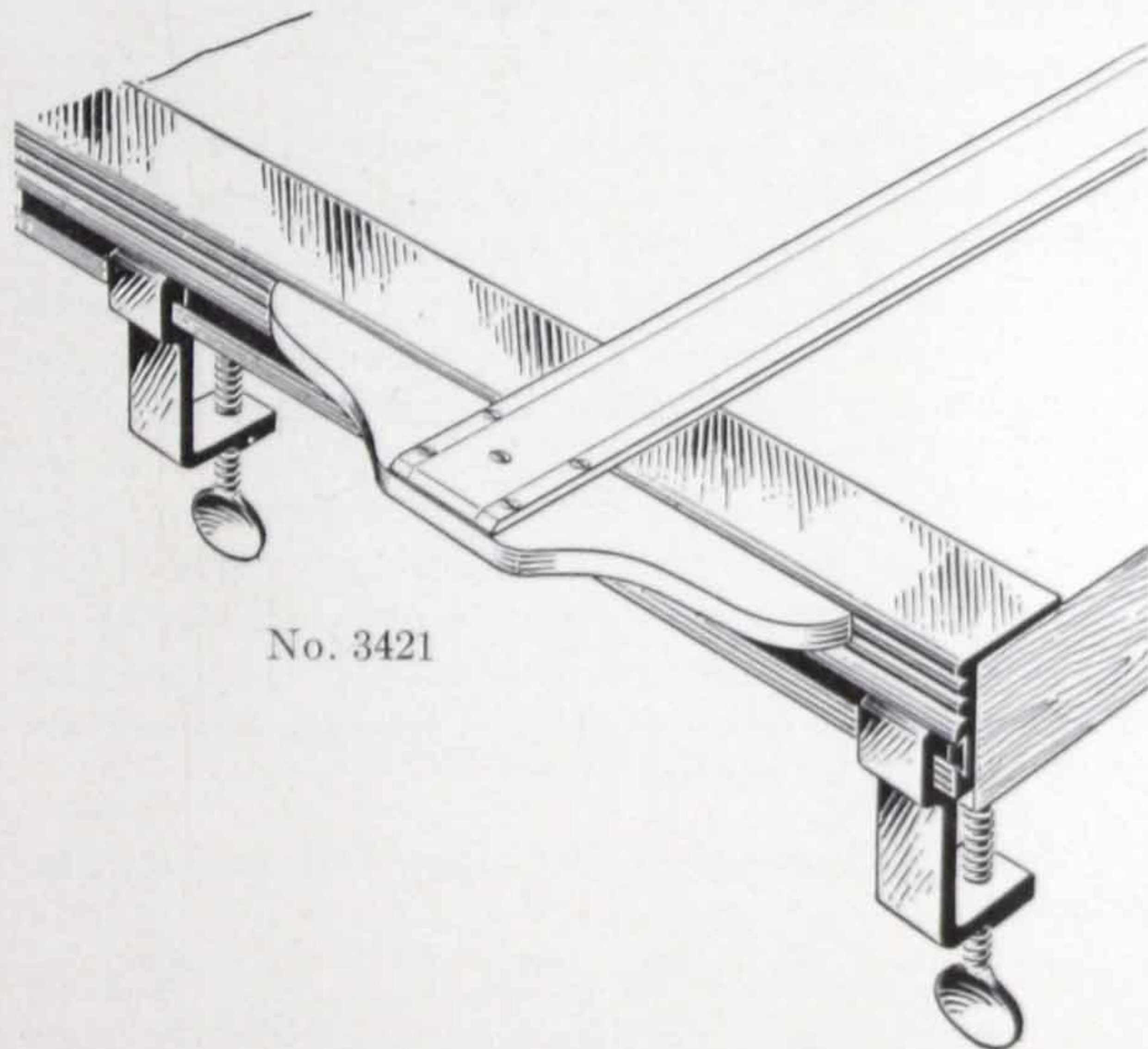
STEEL BLADE T-SQUARES



No. 3414

- No. 3410.** Steel blade nickel-plated, fixed japanned iron head.
Size, inches— 20 24 30 36 42
Code Word..... **TURBINE**
- No. 3414.** Protractor T-Square, steel blade, nickel-plated, shifting head, with protractor divided to half degrees, vernier on end of blade reading to minutes.
Size, inches— 24 30 36 42
Code Word..... **TURFITE**

METAL DRAWING BOARD EDGE



No. 3421

The Metal Drawing board edge can be quickly secured to any edge of the drawing board. It is fastened by means of several thumb clamp-screws, approximately 12 inches apart. It provides a straight and smooth T-Square guide.

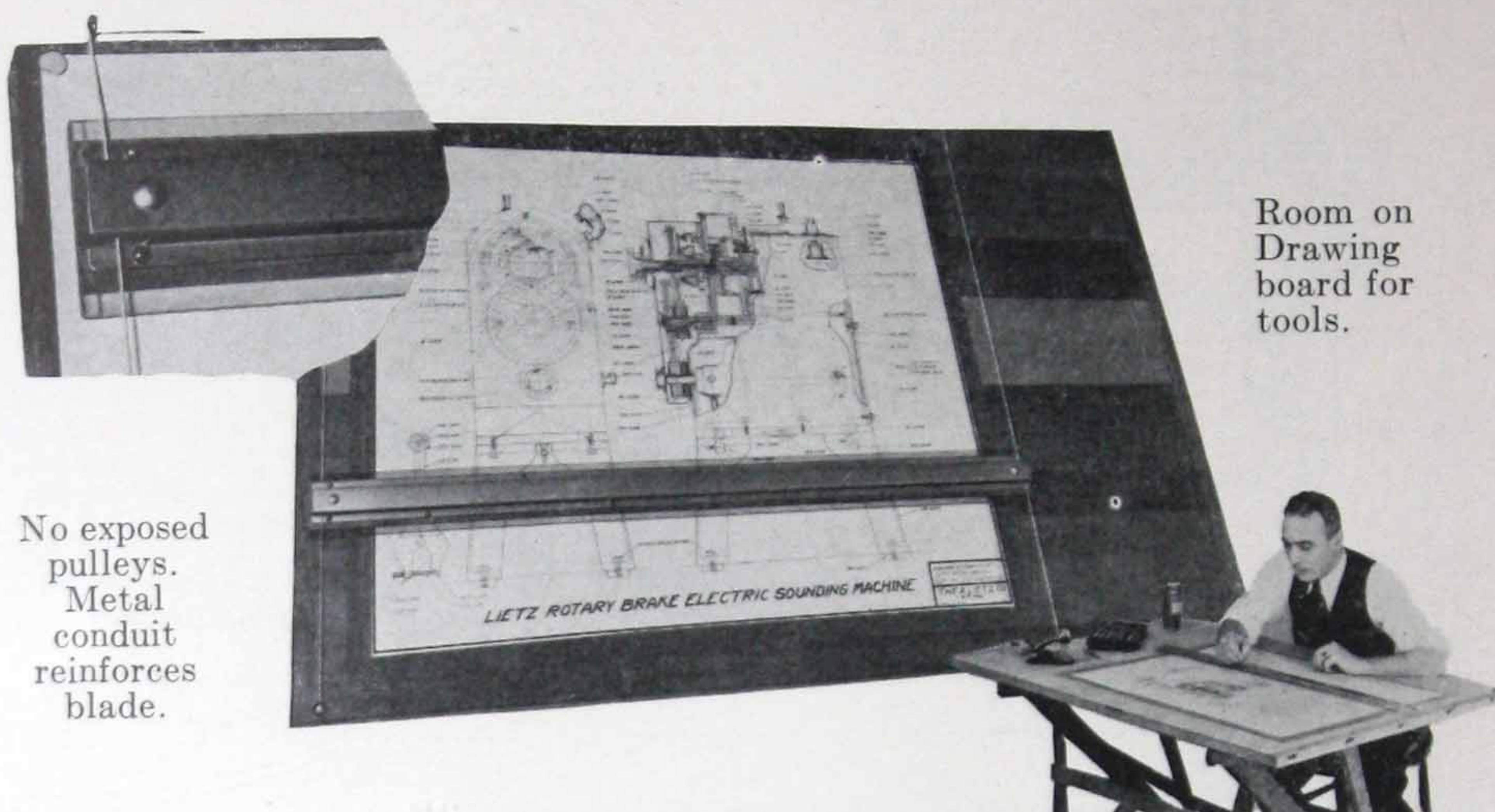
- No. 3421.** Metal Drawing Board Edge complete with clamps.
Size, inches— 24 30 36 42 48
Code Word..... **TURNST**
Each
- No. 3422.** Extra Clamps for Metal Drawing Board Edge.
Code Word..... **TURNEX**

When ordering by telegraph be sure to state SIZE in addition to Code Word.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ ZENITH PARALLEL ATTACHMENT

Patented



No exposed pulleys. Metal conduit reinforces blade.

Room on Drawing board for tools.

No. 3425.

Lietz Zenith Parallel Straightedge

The Lietz Zenith Parallel Straightedge is a simple and improved method of drawing parallel lines. It is rapidly attached to the drawing board. There are only two pulleys as compared to numerous ones on other straightedge attachments and the cord passes from one end of the straightedge to the other through the metal conduit attached to the blade. The Lietz Zenith Parallel Straightedge has the advantage in that it can be secured to any drawing board longer than the straightedge, leaving room on the drawing board for tools and drafting equipment. As the straightedge does not protrude beyond the edge of the board it cannot be disarranged or accidentally struck by anyone passing. This device is so constructed that it cannot accidentally slip. Still, it is possible to quickly adjust the straightedge to the drawing. The Lietz Zenith Parallel Straightedge can be quickly transferred from one drawing to another, whereas most of the forms of parallel rule attachments are permanently attached to the table to which they are fitted.

No. 3425. Lietz Zenith Parallel Attachment complete with maple transparent celluloid lined straightedge.

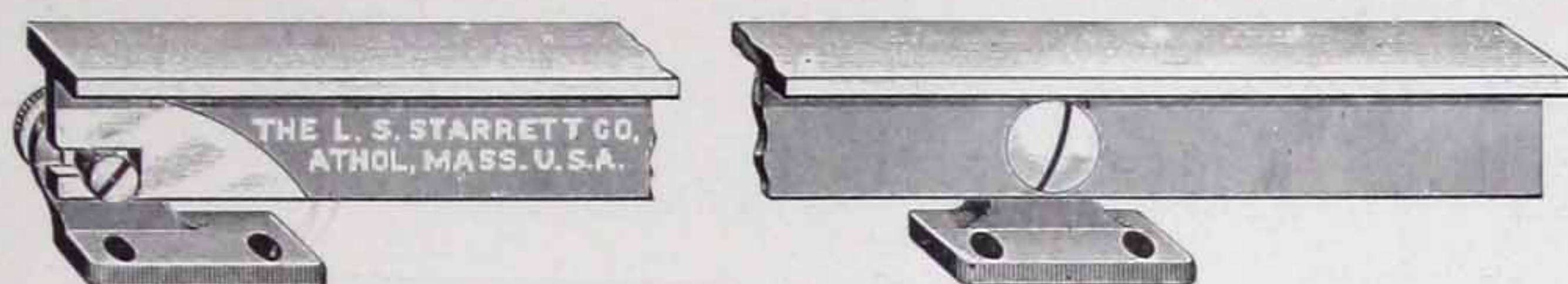
Length of straightedge, inches—	36	42	48	60	72	84	96
Code Word.....	TURNCAR						

No. 3426. Tinsel Cord for Lietz Zenith Parallel Attachment on	Per 100 ft.
wooden spool. Code Word.....	TURNCOB

When ordering by telegraph be sure to state SIZE in addition to Code Word.

SEE PRICE LIST IN BACK OF CATALOG

ADJUSTABLE METAL DRAWING BOARD EDGE



No. 3433

No. 3433. Adjustable Metal Drawing Board Edge. This consists of a metal T-rail, or straightedge with attachments to secure it to end, or end and side of drafting board or table. These are ground perfectly straight and are nickel plated. The T-square used against this insures more accurate results than can be obtained by working against wooden board or table.

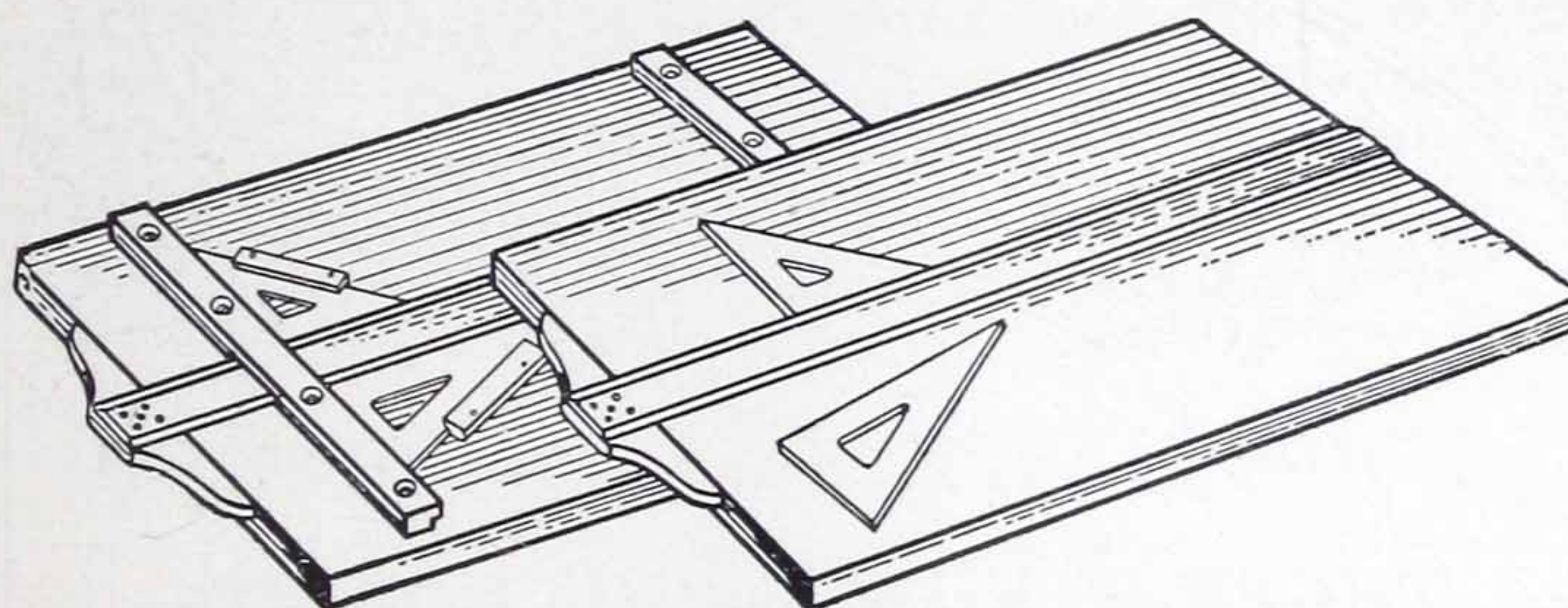
Size, inches—

24 30 36 40 48 60

Code Word.....**TURNDUN**

A cam device at the end permits fine adjustments in forming a perfect right angle when two of the metal T-rails are used together.

DRAWING KITS OR SKETCH BOARDS



Our Drawing Kits consist of a well-seasoned, rigidly constructed white pine drawing board, a T-square and a 45 degree and 30x60 degree celluloid triangle. When not in use the triangles and T-square are firmly held in place underneath the drawing board. This is an excellent outfit for outdoor sketching and for students.

No. 3435. Suitcase Drawing Kit 10x12 inches.....**TWILL**

No. 3436. Suitcase Drawing Kit 13x19 inches.....**TWIT**

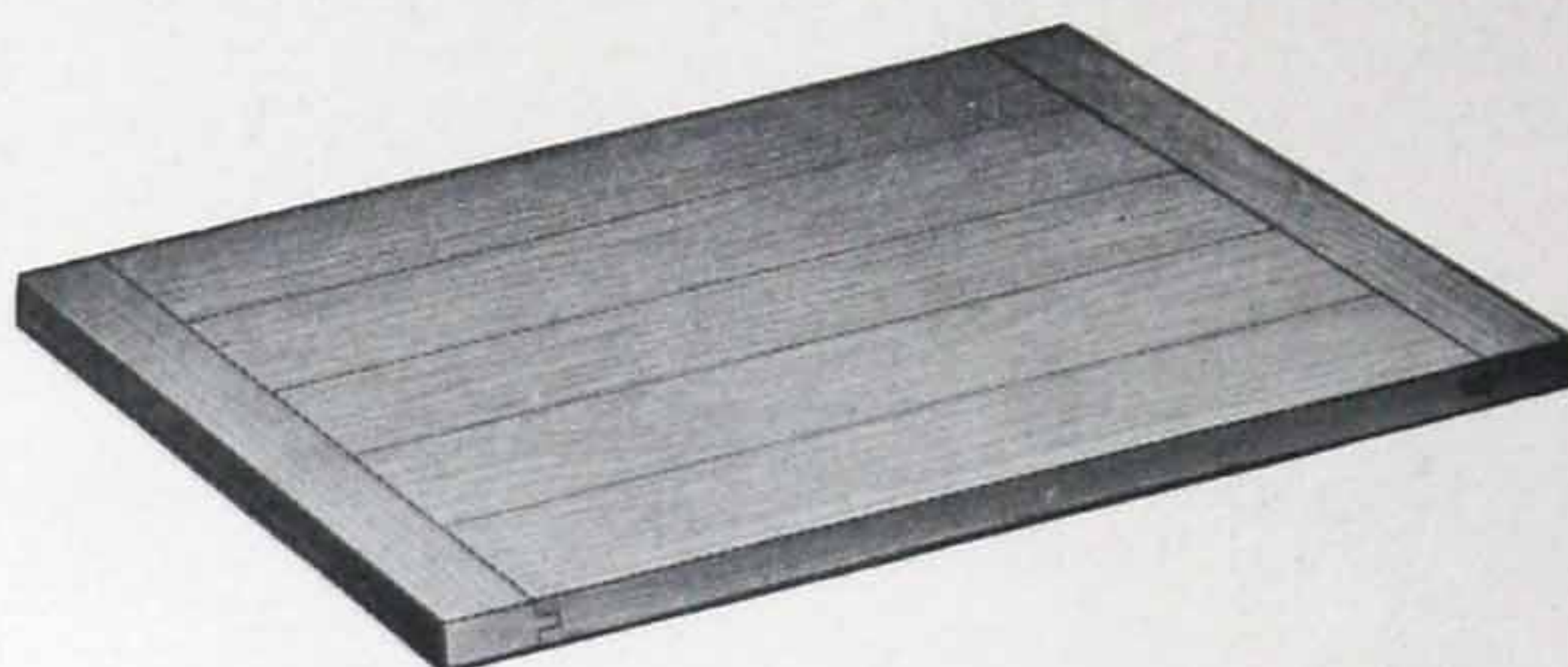
No. 3437. Suitcase Drawing Kit 17x22 inches.....**TWITCH**

When ordering by telegraph be sure to state SIZE in addition to Code Word.

SEE PRICE LIST IN BACK OF CATALOG

DRAWING BOARDS

Our drawing boards are of the best workmanship and material. Made of $\frac{3}{4}$ inch stock, tongued and grooved and with end cleats to strengthen the board. The wood is entirely without grain, the thumbtacks are easily removed and the points will not leave pin holes. Surfaced both sides.



		Code Word
No. 3440A.	Basswood Drawing Board, size 12x17 in.....	UKASE
No. 3440B.	Basswood Drawing Board, size 16x21 in.....	ULNAR
No. 3440C.	Basswood Drawing Board, size 18x24 in.....	ULSTER
No. 3440E.	Basswood Drawing Board, size 20x26 in.....	ULTIMA
No. 3440F.	Basswood Drawing Board, size 23x31 in.....	UMBEL
No. 3440G.	Basswood Drawing Board, size 31x42 in.....	UMBO

THREE-PLY DRAWING BOARDS

These boards are light and strong. Made of three-ply basswood, surfaced both sides. Suitable for outdoor sketching.

		Code Word
No. 3442A.	Three-ply Drawing Boards, size 15x20 in.....	URASOL
No. 3442B.	Three-ply Drawing Boards, size 20x26 in.....	URSINE
No. 3442C.	Three-ply Drawing Boards, size 20x30 in.....	USANCE
No. 3442D.	Three-ply Drawing Boards, size 30x40 in.....	USHER

SEE PRICE LIST IN BACK OF CATALOG

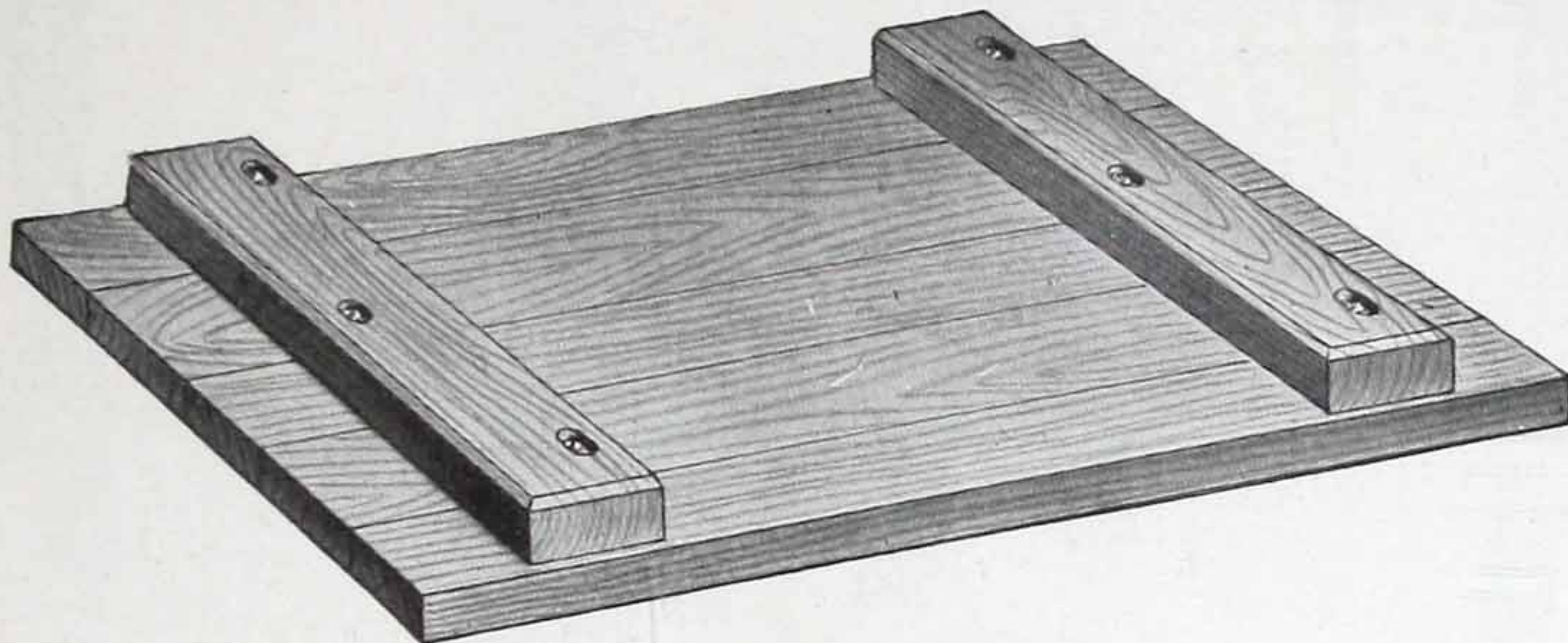
PINEWOOD DRAWING BOARDS

Extra Fine Quality

With Hardwood Ledges

The hardwood ledges are attached to the board by means of screws, which pass through oblong slots, with metal oblong washers, to allow for contraction and expansion.

Made of narrow strips of thoroughly seasoned, especially selected Pinewood tongue and groove construction. Finished with a light coat of shellac.



No. 3450

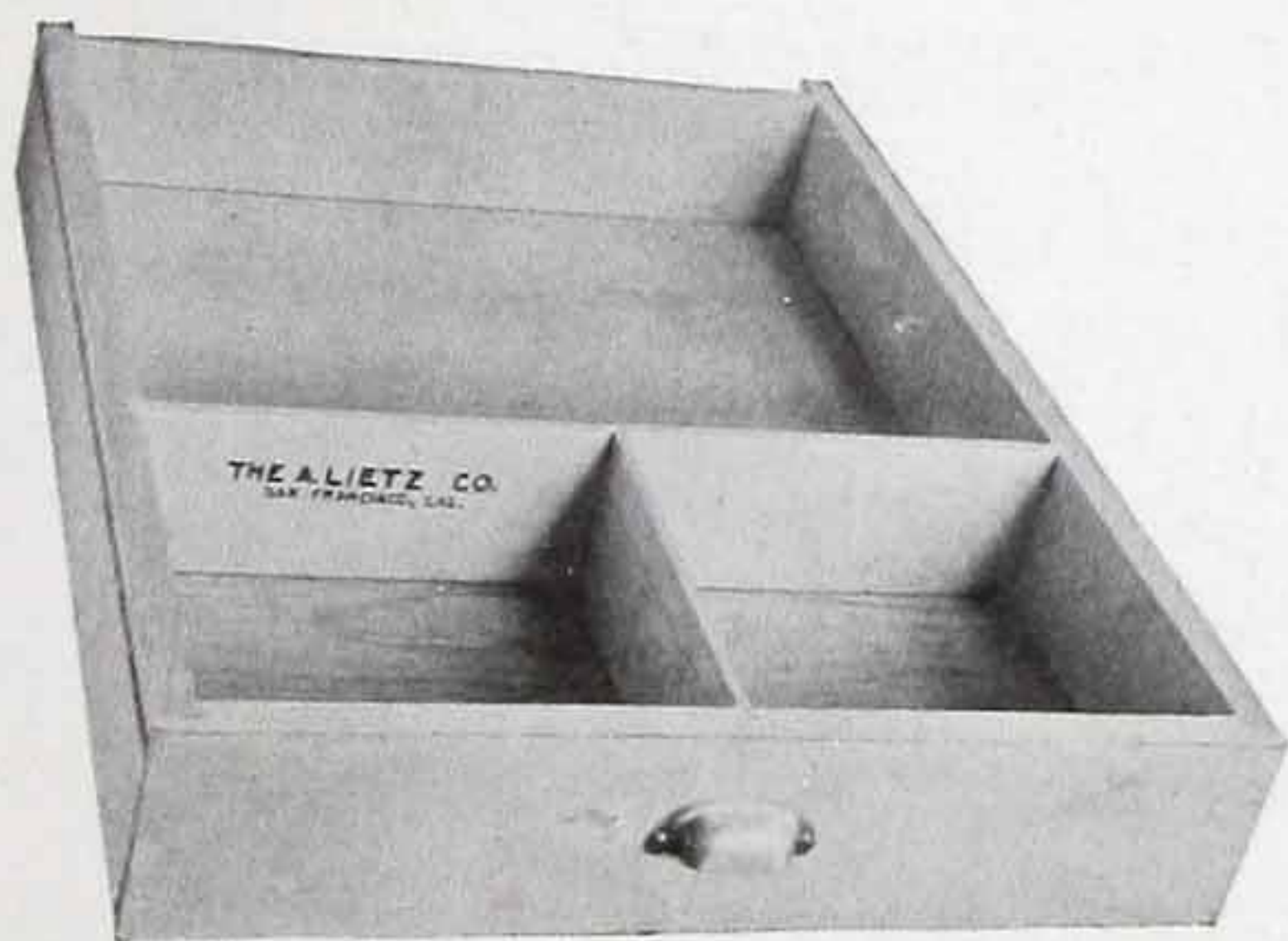
No. 3450. Pinewood Drawing Board.

	Code Word		Code Word
31x42.....	VACA	42x72.....	VAGRANT
36x48.....	VACUOLE	42x84.....	VAIL
36x60.....	VACUUM	48x72.....	VALANCE
36x72.....	VADE	48x84.....	VALE
42x60.....	VAGINA	48x96.....	VALENTIA

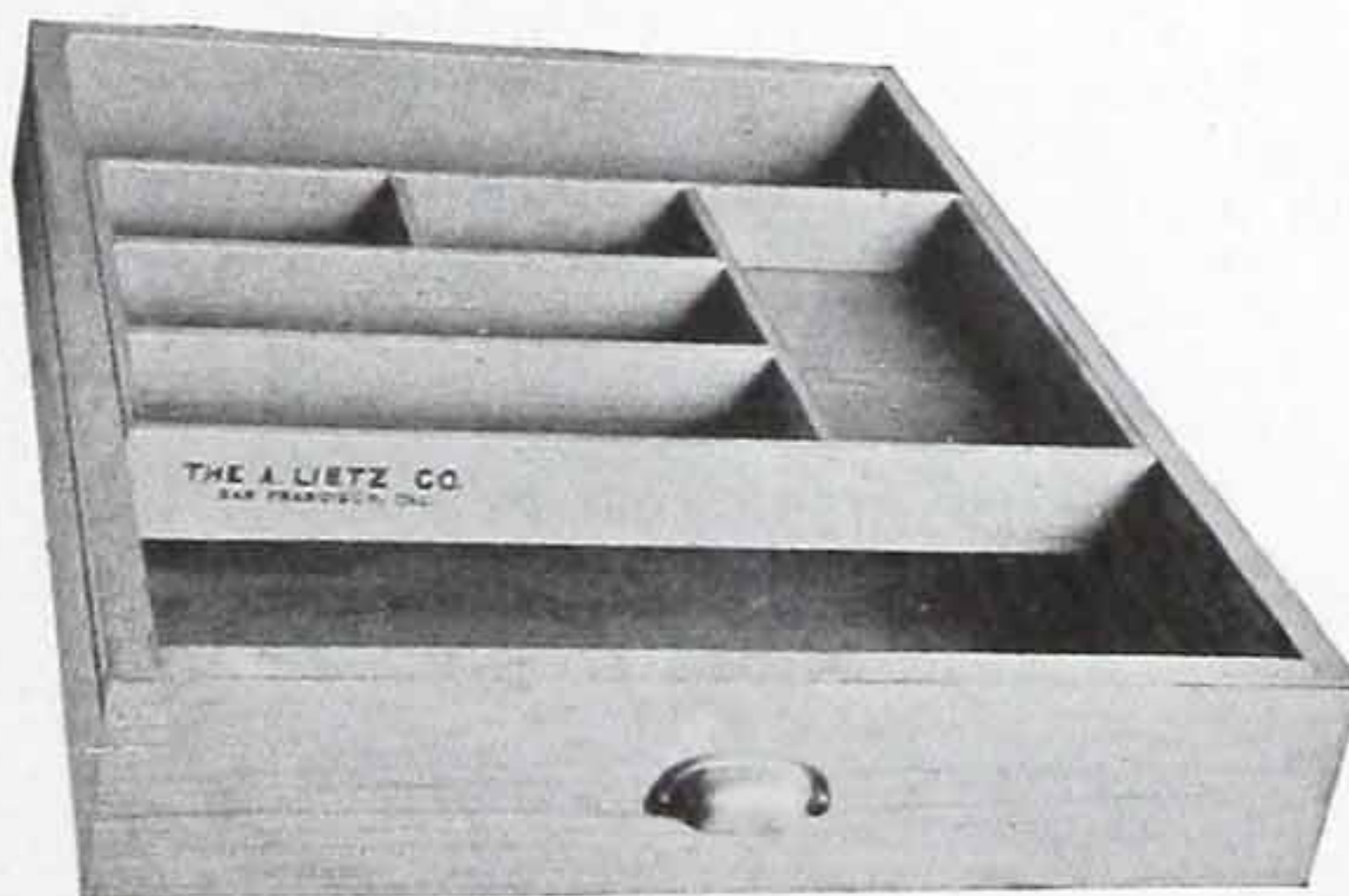
Note: All the larger boards have three hardwood ledges. We can make any other size board to order. Prices include crating for shipment.

DRAWERS FOR DRAWING BOARDS

With cleats to attach to board



No. 3454A



No. 3454B

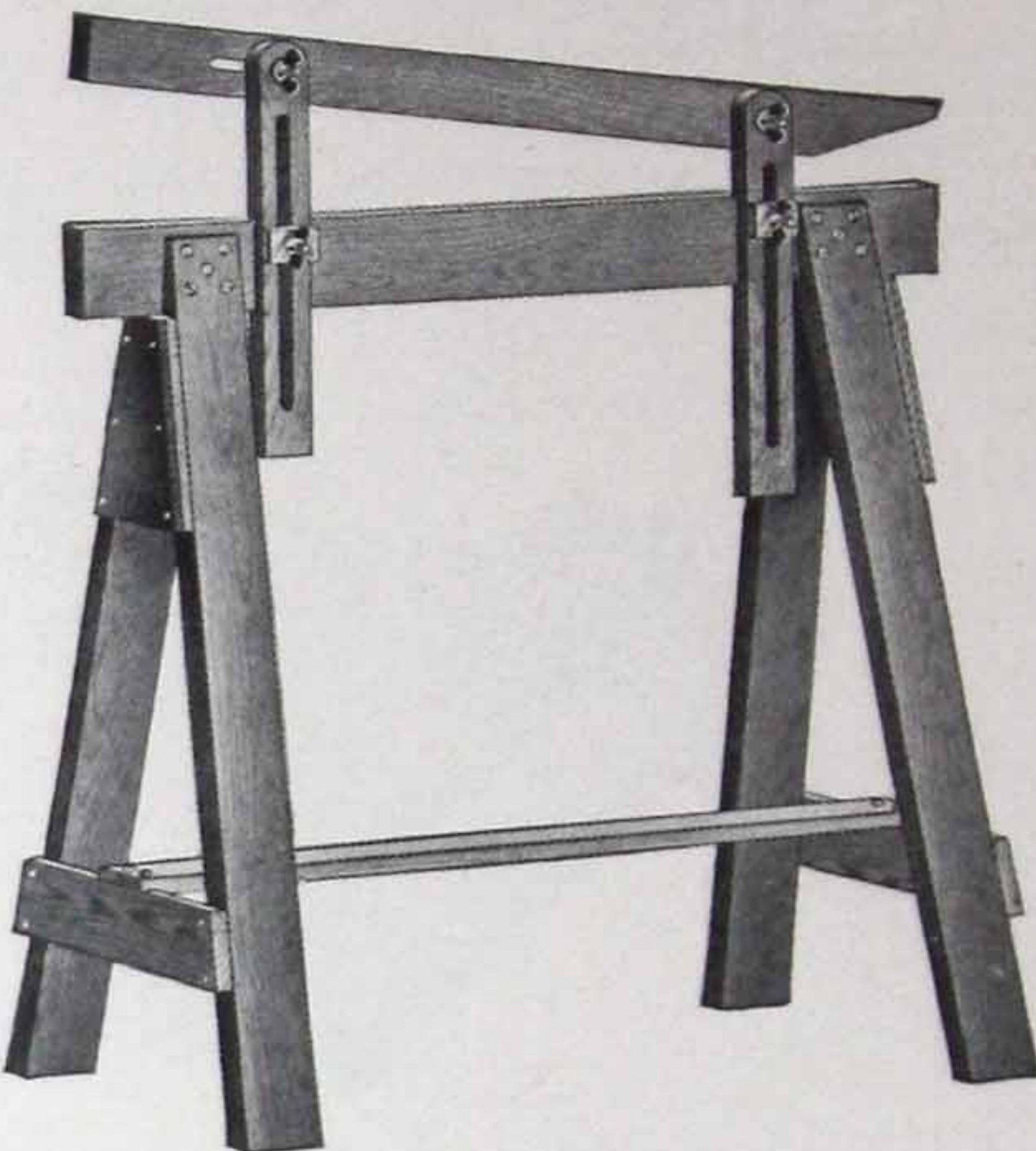
	Code Word
No. 3454A. Drawers for drawing boards, 20x24x4 inches inside, partitioned, with cleats to attach to board.....	VECTOR
No. 3454B. Drawers for drawing boards, 20x24x4 inches inside, with sliding tool tray, with cleats to attach to board.....	VEDA

SEE PRICE LIST IN BACK OF CATALOG

WOODEN HORSES FOR DRAWING BOARDS



No. 3475-80



No. 3484

All horses are 37 inches high.

- Code Word
- No. 3475.

Plain Wooden Horses, pinewood, straight top only,
30 inches wide. Per pair.....

VEDANTA
- No. 3476.

Plain Wooden Horses, pinewood, straight top only,
38 inches wide. Per pair.....

VEDETTE
- No. 3478.

Hardwood Horses, fine quality, straight top only,
38 inches wide. Per pair.....

VELOUR
- No. 3479.

Removable slanting top, 30 inches wide. Per pair...

VELOUTE
- No. 3480.

Removable slanting top, 38 inches wide. Per pair...

VENAL

ADJUSTABLE HORSES

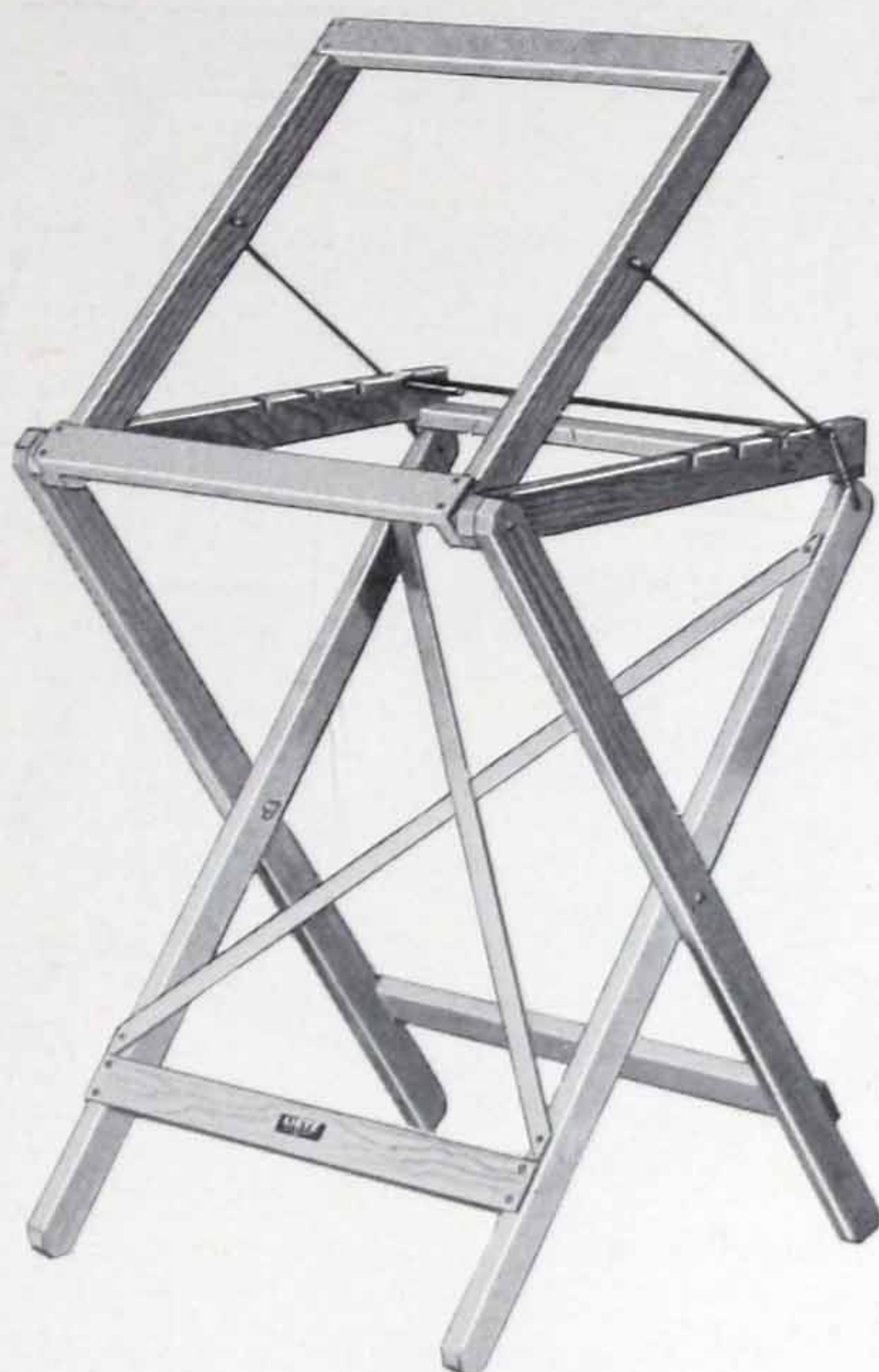
- No. 3484.

Hardwood Horses, fine quality, with adjustable top.
Minimum height of 39" and maximum height of 50"
when level. When used on a slant it has a minimum
height of 37" at the front and 52" at the back. When
it is desired to use the adjustable horse at a hori-
zontal height of 37", the adjustable device is simply
removed. Per pair.....

VENDAGE

SEE PRICE LIST IN BACK OF CATALOG

THE "FREMONT" COMBINATION DRAWING TABLE



No. 3486

The Fremont Combination Drawing Table meets every requirement of the draftsman and is especially popular because it may be put to general use when not needed for drawing. It is neatly finished and fits in with the other furniture of the home and apartment. The construction is light and strong and the table is collapsible and can be moved with ease and is also desirable for lecture work or outdoor sketching. The top is secured flat in a horizontal position, but may on a moment's notice be elevated to any slant for the convenience of the draftsman.

This table is sold without drawing board top as any drawing board No. 3440 can be used.

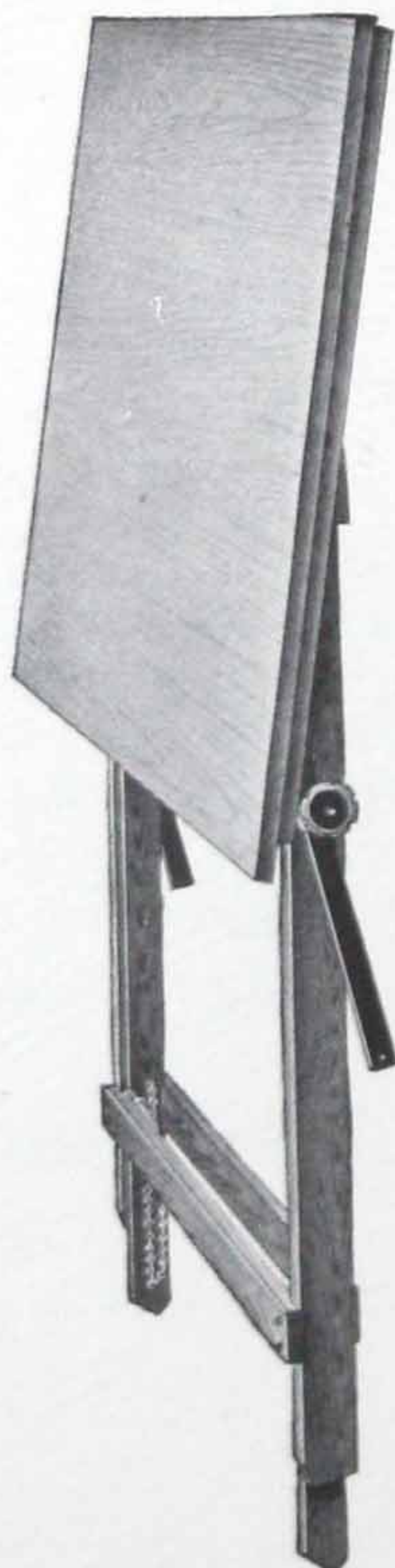
No. 3486. Fremont Combination Drawing Table. Code Word.....**VERANDA**

SEE PRICE LIST IN BACK OF CATALOG

THE "PIEDMONT" FOLDING DRAWING TABLE



No. 3488



There is a demand for a light, adjustable table and the Piedmont Table will answer every requirement in this line.

It is well braced and substantially made and can be folded and moved about without inconvenience.

All tables have hardwood base and pine drawing board top, finished natural color.

No. 3488. Piedmont Folding Drawing Table with drawing board top, size 31x42 inches. Height 38 inches.....Code Word, **VERBENA**
 Shipping weight, 75 lbs.

The above table can be furnished in other sizes on special order. It is very suitable for educational institutions and quotations will be cheerfully furnished on quantities.

SEE PRICE LIST IN BACK OF CATALOG

THE "LAKEPORT" DRAWING TABLE



No. 3489

The Lakeport Drawing Table is strong, rigid, durable and well adapted for professional work or for use in the drafting room of educational institutions. The stand is made of hardwood and the pinewood top is made of narrow dovetailed strips. Natural finish.

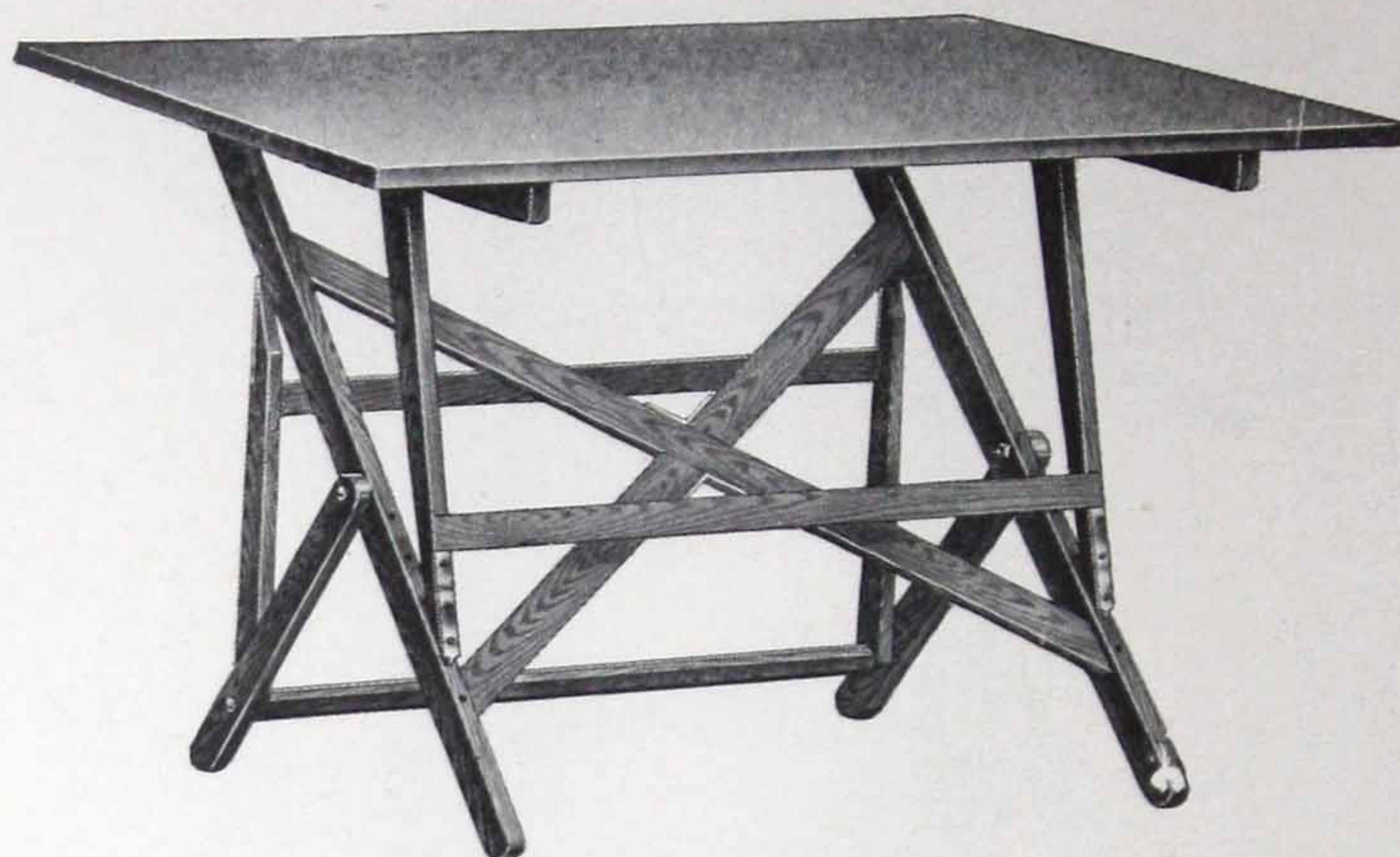
Table No. 3489A is adjustable from 30 to 40 inches and Nos. 3489B, C and D can be adjusted from 32 to 40 inches in height. Semi-circular iron braces allow a maximum tilting adjustment of the drawing board top.

Code Word

- No. 3489A.** Lakeport Drawing Table with drawing board top.
24x32 inches. (Shipping weight 55 lbs.).....**VERGER**
- No. 3489B.** Lakeport Drawing Table with drawing board top.
31x42 inches. (Shipping weight 95 lbs.).....**VERITY**
- No. 3489C.** Lakeport Drawing Table with drawing board top.
36x48 inches. (Shipping weight 115 lbs.).....**VERMUTH**
- No. 3489D.** Lakeport Drawing Table with drawing board top.
36x60 inches. (Shipping weight 125 lbs.).....**VERNAL**

SEE PRICE LIST IN BACK OF CATALOG

THE "OAKLAND" TRESTLE DRAWING TABLE



No. 3490

The Oakland Trestle Drawing Table is light in weight, folds very compactly and is easily moved from place to place. It is easily adjusted and rests firmly in any position. Adjustments range from 29 to 42 inches in height. Fitted with high-grade pinewood drawing board top.

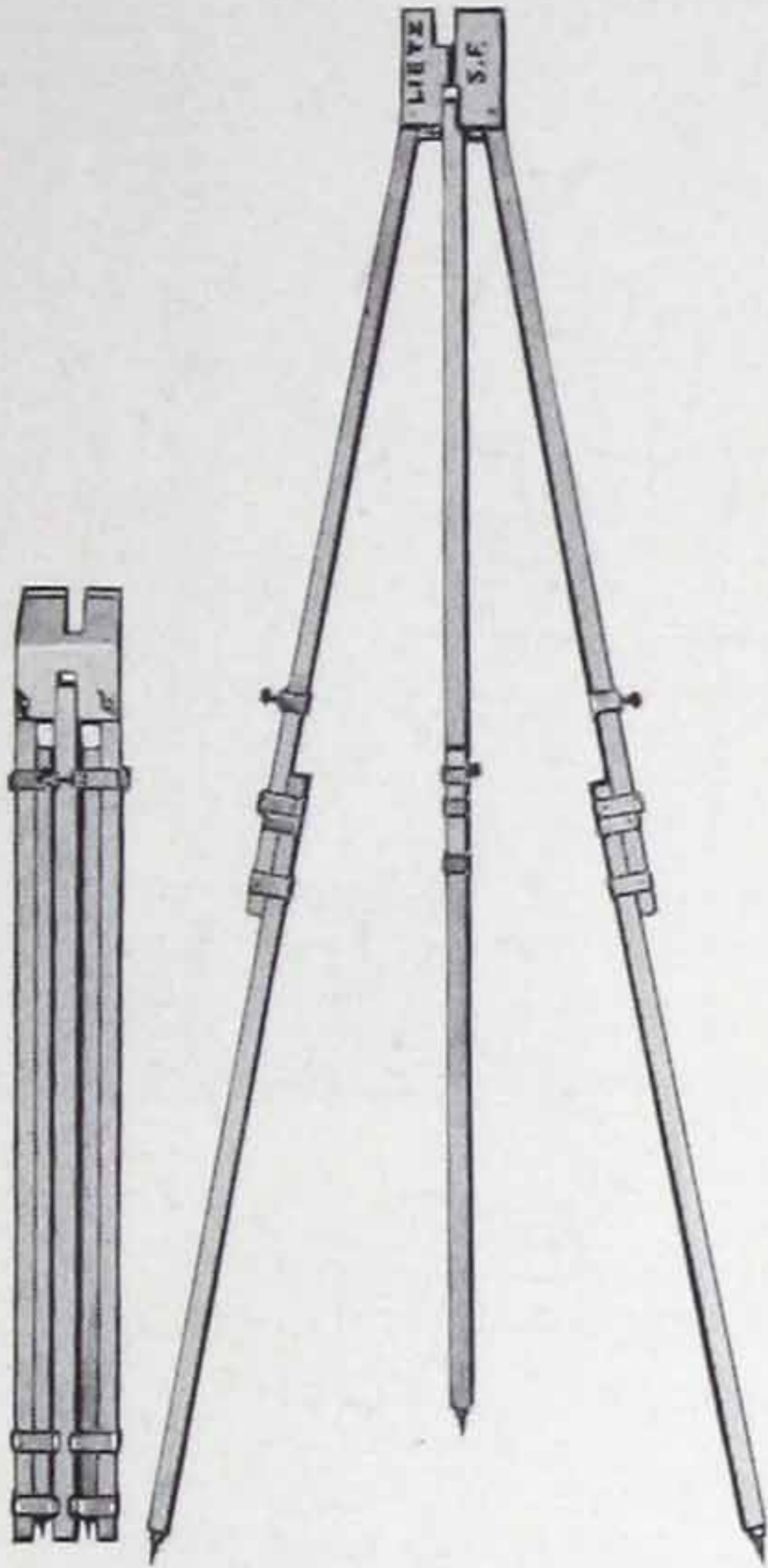
Code Word

- No. 3490B.** Oakland Trestle Drawing Table with drawing board top 31x42 inches. (Shipping weight 80 lbs.).....**VERONA**
- No. 3490C.** Oakland Trestle Drawing Table with drawing board top 36x48 inches. (Shipping weight 100 lbs.).....**VERSUS**
- No. 3490D.** Oakland Trestle Drawing Table with drawing board top 36x60 inches. (Shipping weight 120 lbs.).....**VERTEX**

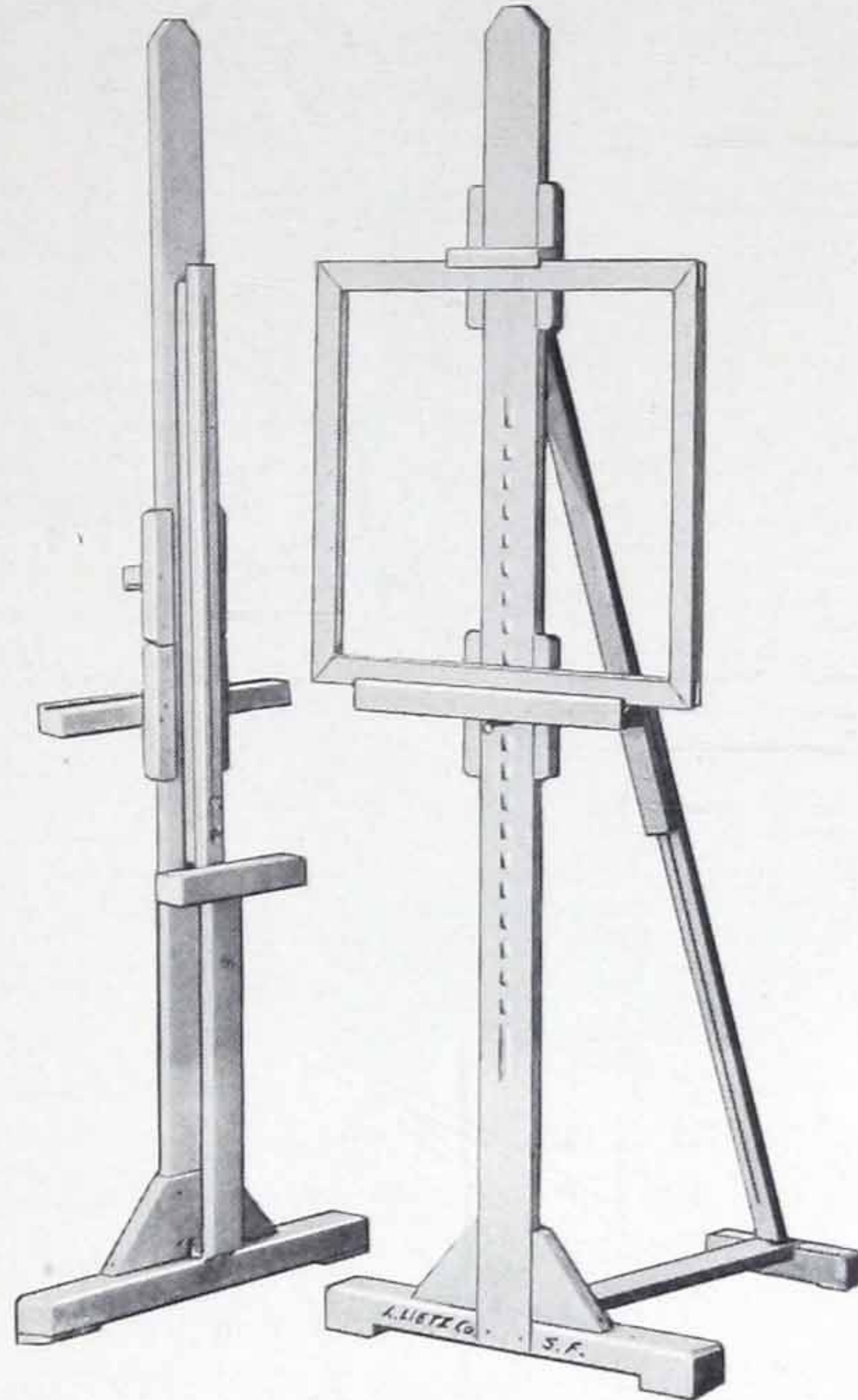
Oakland Trestle Drawing Tables can be furnished in other sizes on special order. Quotations sent on request.

SEE PRICE LIST IN BACK OF CATALOG

LIETZ ARTISTS' EASELS



No. 3492



No. 3493

- No. 3491.** Artists' Folding Easel, 64" high, 35" when folded. Pinewood, with cross bar 19" long. Bolts and Wing nuts cadmium plated.

Code Word..... **VERTO**

- No. 3492.** Hardwood Easel, 67" high, 41" when folded. Sliding extension legs, adjustable Canvas holder. Bolts and Clamps cadmium plated.

Code Word..... **VERTOON**

- No. 3493.** Adjustable Studio Easel, Pinewood with rack adjustment from 2 ft. to 5 ft. Total height 7 ft. Will accommodate 60" canvas. Easel is collapsible and can be moved with ease and stored in small space.

Code Word..... **VERTUNG**

SEE PRICE LIST IN BACK OF CATALOG

DRAFTSMEN'S APRONS AND SMOCKS



No. 3494



No. 3495

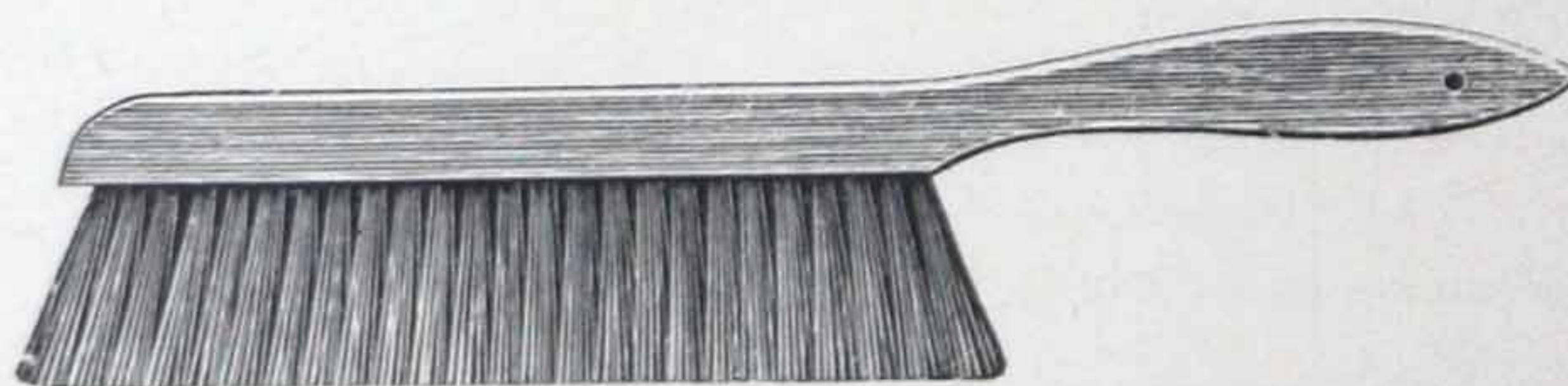
Code Word

No. 3494. Draftsmen's Apron, olive drab covert cloth, with upper breast pocket sewed on at an angle for pencils, and two small lower pockets..... **VESTRY**

No. 3495. Draftsmen's Smock, made of pretested lineen, tan or light blue in color; carried in sizes 36 to 44..... **VETCH**

DUSTING BRUSHES

For removing crumbs of rubber, etc., from drawings.



No. 3500. Dusting Brush, flat, bristles 2 inches long, brush $8\frac{1}{2}$ inches long with 6 inch handle..... **VETERAN**

SEE PRICE LIST IN BACK OF CATALOG

THE A-R-S DRAWING STAND

Adjustable, Rigid and Strong



The A - R - S Drawing Stand and Easel fills the need for an exceptionally rigid and inexpensive table. Its attractive design and sturdiness have made it the favorite among artists and draftsmen, and in the art and drafting departments of our educational institutions.

The base is entirely of iron, attractively finished in battle-ship gray enamel, and the construction such that the table is positively rigid and without wobble. The drawing board top can be instantly adjusted to any desired height or position, and revolved on its center. Table can be supplied with material tray or drawer on double swinging arm, which can be adjusted to any position on either left or right hand side.

No. 3502 A-R-S Drawing Stand with
Oak Material Drawer No. 3503.

- No. 3502.** A-R-S Drawing Stand with Drawing Board top 23x31.....Code Word, **VEWAN**
- No. 03502.** A-R-S Drawing Stand only without Drawing Board top.....Code Word, **VEWANO**
- No. 3503.** Varnished Oak Drawer and Tray, 10 $\frac{1}{4}$ x14 $\frac{1}{2}$, with double swinging arm and attachments.Code Word, **VEWILL**
- No. 3504.** Varnished Oak Tray only, 9x13 inches, with double swinging arm and attachments.Code Word, **VEWITO**



A-R-S Stand used as easel.

SEE PRICE LIST IN BACK OF CATALOG

THE "FRANCISCO" DRAWING TABLE



No. 3518

This table is built to meet the demand for a practical iron base adjustable drawing table. It is sturdily constructed of cast iron with machined standards and slides.

The table is rigid at all times and the top is raised or lowered by turning the hand wheel. It stays put wherever you stop without the use of clamps or ratchets. Various angles of the top can be obtained by the simple operation of a small hand wheel.

- Code Word
- No. 3518.** Francisco Drawing Table with pinewood top, 36x48.. **VINIC**
Francisco Drawing Table with pinewood top, 36x60.. **VINOUS**
Francisco Drawing Table with pinewood top, 42x72.. **VINTAGE**
Francisco Drawing Table with pinewood top, 42x84.. **VINTNER**

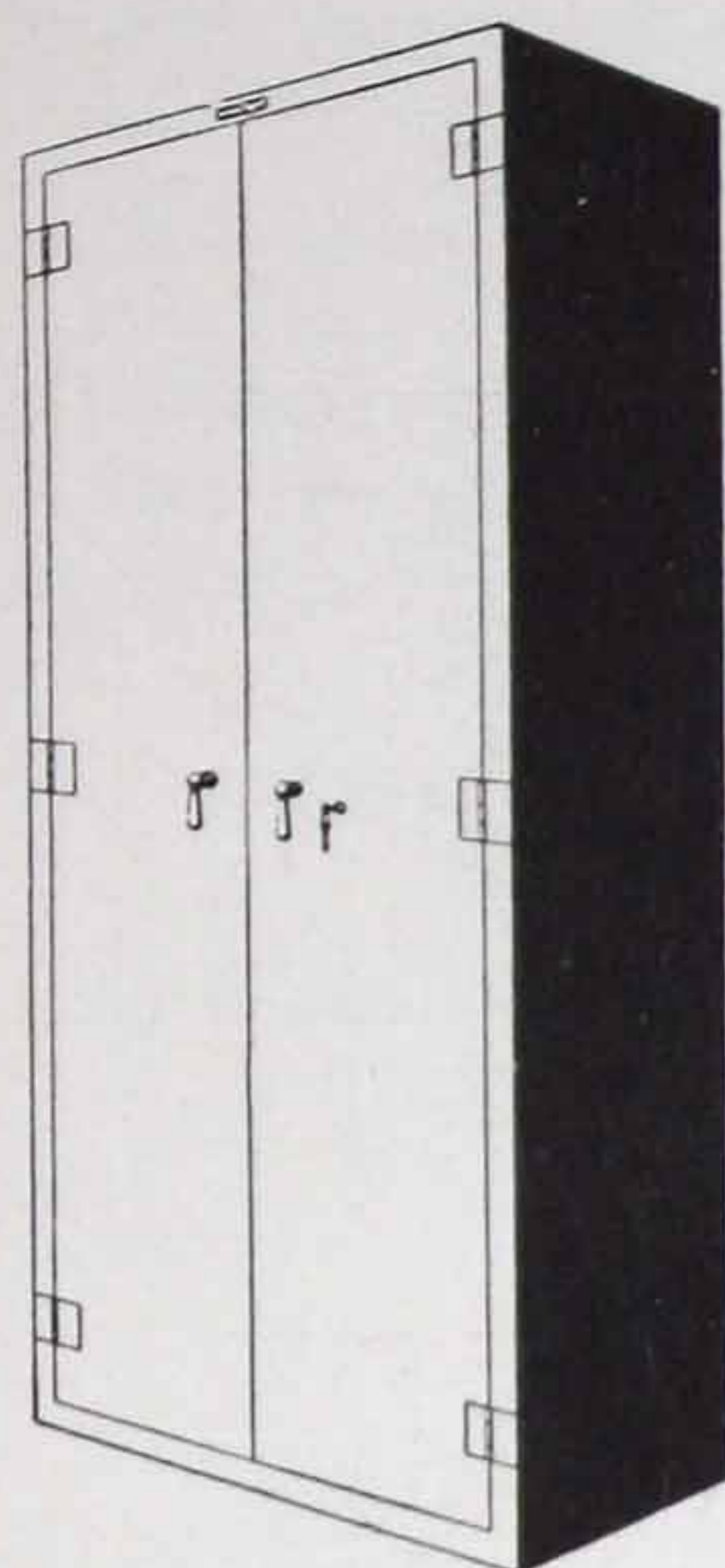
The Francisco Drawing Table can be furnished with any other size top. Prices vary according to size.

TOOL DRAWER

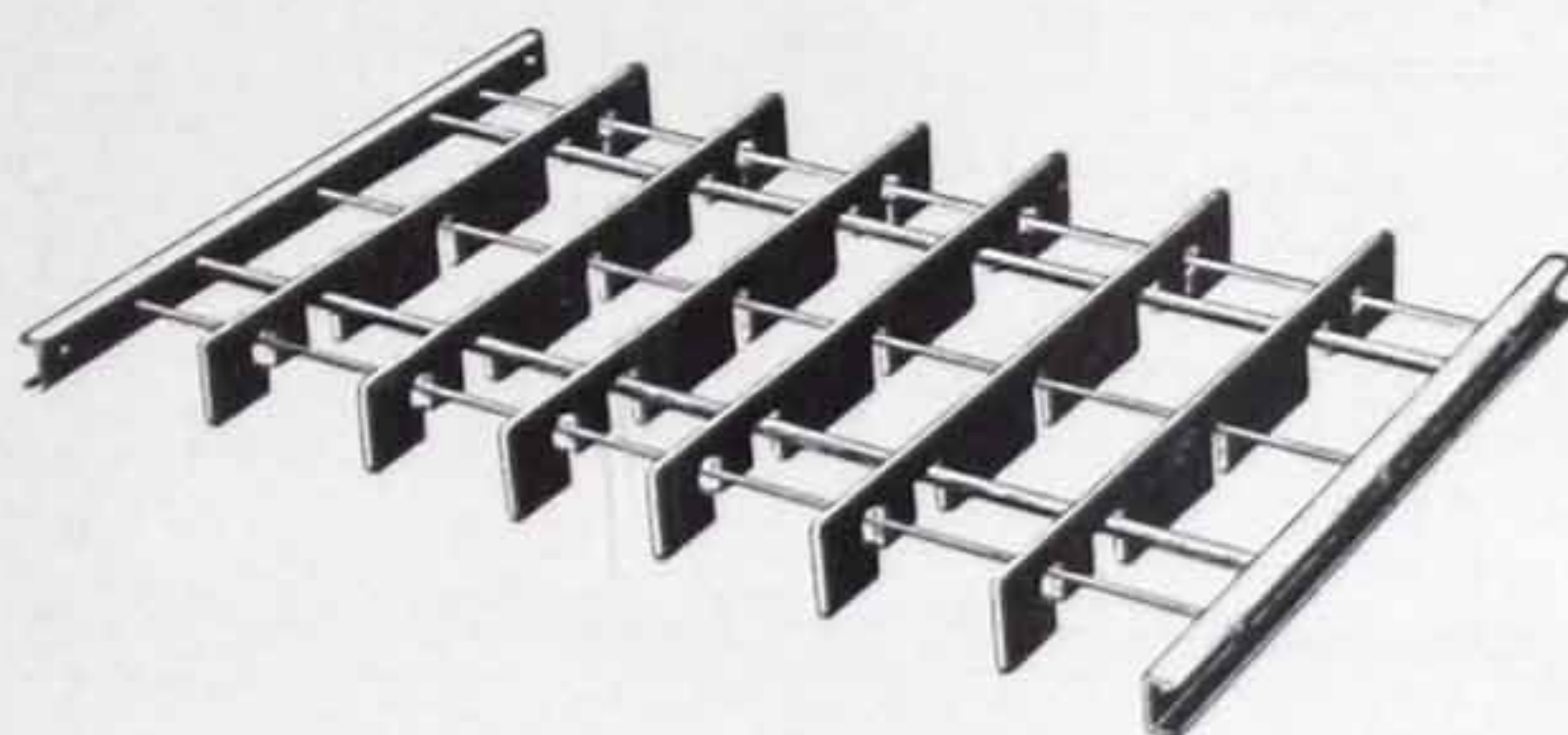
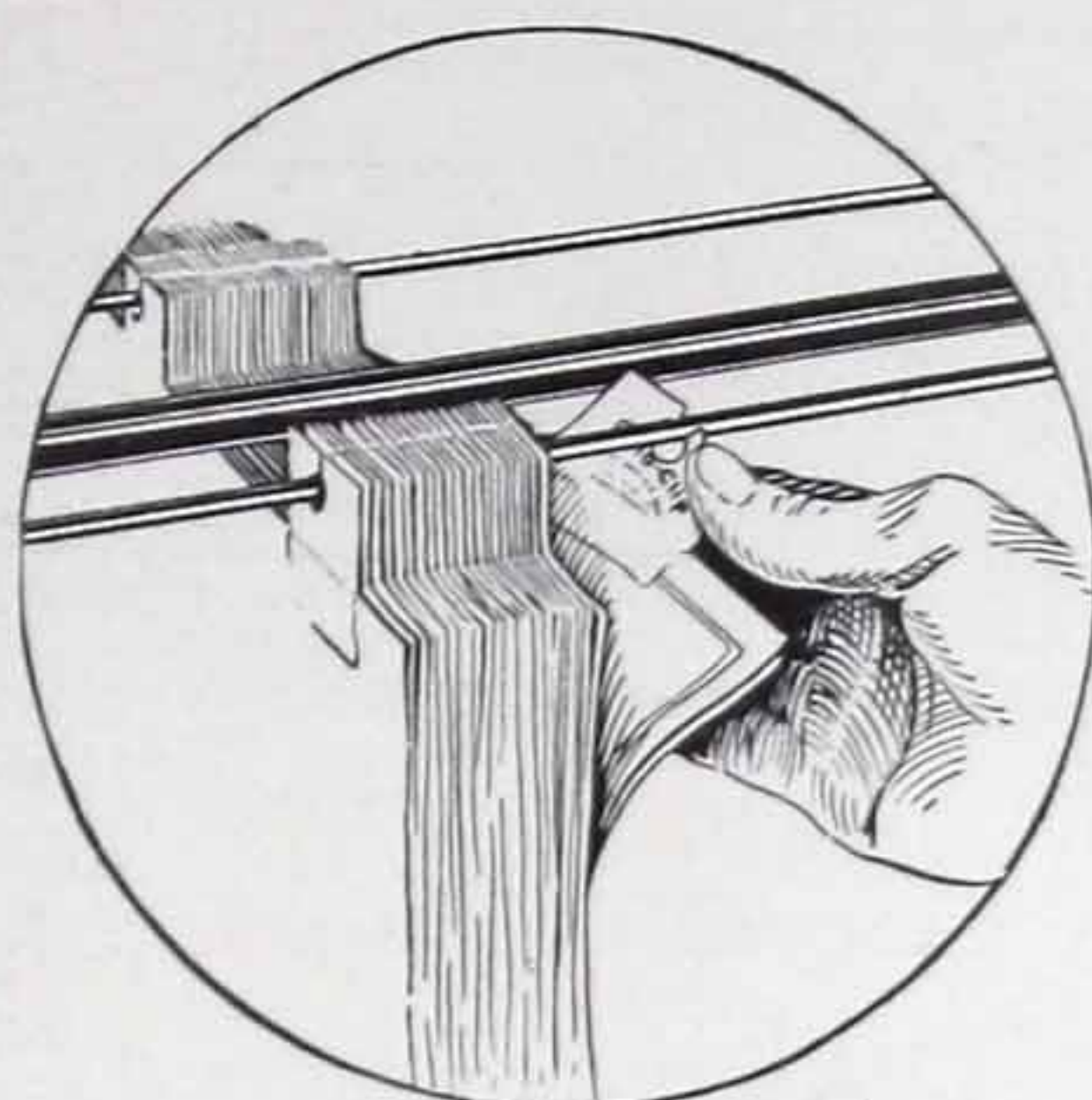
- Code Word
- No. 3516A.** Adjustable Tool Drawer for Francisco Tables.... **VINA**

SEE PRICE LIST IN BACK OF CATALOG

CELLO-CLIP MAP AND PLAN FILES



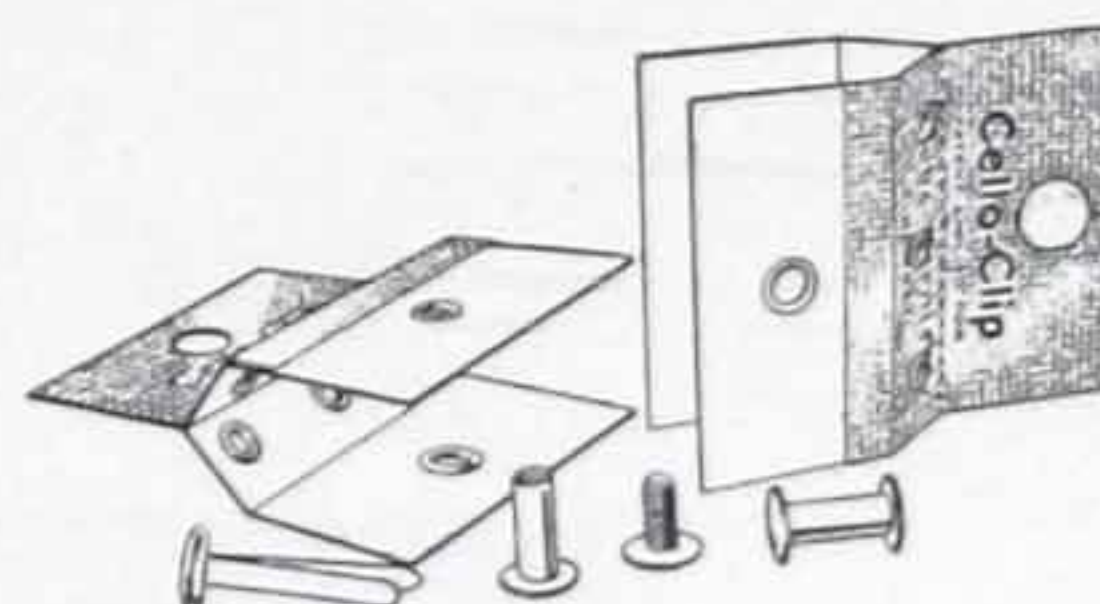
No. 3526



No. 3528



No. 3527A and B



No. 3527C

Cello-Clip vertical suspension is a practical method of filing large sheets either singly or in groups. It is not necessary to remove sheets for reference and they can always be found instantly. The Cello-Clip cabinets are made of heavy steel strongly reinforced. Cello-Clip racks are for vault installation and extra rod assemblies are available for filing more than one tier of drawings in cabinet. The Cello-Clip can be quickly and permanently fastened. The adhesive skirts grip the sheets tightly and will not slide off or tear.

CELLO-CLIP CABINETS

	Deep Inside	Outside Dimensions		Deep	Approximate Shipping Wt.	Code Word
		High	Wide			
No. 3526-C24	25½"	72⅜"	36"	27"	318 lbs.	VIRAFIT
No. 3526-C30	31½"	72⅜"	36"	33"	334 lbs.	VIRAGO
No. 3526-C36	37½"	72⅜"	36"	39"	360 lbs.	VIRDO

CELLO-CLIP OPEN RACK

	High	Outside Dimensions		Deep	Approximate Shipping Wt.	Code Word
		Wide				
No. 3526-S24	78"	36"		24"	120 lbs.	VIRDOR
No. 3526-S30	78"	36"		30"	150 lbs.	VIRDOTH

One rod assembly and set of six riders included with each cabinet and open rack.

CELLO-CLIPS

		Code Word
No. 3527A.	Regular type for individual sheets and small groups	VIRGIN
No. 3527B.	Heavy duty type for heavy single sheets or for permanent binding of groups	VIRGINIA
No. 3527C.	Cello-Clip group holders with binding screws for filing groups of drawings up to 1 inch	VIRGIST

EXTRA ROD ASSEMBLIES

		Code Word
No. 3528-C24.	For Cabinet No. 3526-C24 with 3 clip rods	VIRGOIL
No. 3528-C30	For Cabinet No. 3526-C30 with 4 clip rods	VIRGOLD
No. 3528-C36.	For Cabinet No. 3526-C36 with 5 clip rods	VIRGONE

Six riders included in price of each rod assembly.

LIETZ FOUR-POST DRAWING TABLES

The four-post tables listed on the following pages are built in our own factory and are constructed of the finest materials and workmanship.

The drawing board tops are made of narrow strips of thoroughly seasoned sugar pine, tongue and groove construction, with hardwood end cleats and heavy cleats underneath, fastened with screws passing through oblong washers which allow for contraction and expansion. Both sides of the boards are finished with one coat of varnish and the top surface is sanded smooth. They have a hardwood protection strip in front.

The bodies are built of best grade oak and finished in beautiful light golden oak. The hardware is of oxidized finish.

These tables are shipped knocked down. They can be quickly assembled and when set up and all bolts tightened are extremely rigid and solid.

THE "ARCATA" DRAWING TABLE



Arcata Drawing Table, 34 inches high with 3 inch raising blocks, with adjustable top, made in three sizes.

	Size of top	Drawers, Inside dimensions	Shipping Weight	Code Word
No. 3529A.	36x60 in.	Tool Drawer 10½"x27¼"x3¾"	150 lbs.	VIRIAD
No. 3529B.	36x72 in.	Tool Drawer 17⅝"x24"x3¾"	180 lbs.	VIRIAFT
No. 3529C.	42x84 in.	Tool Drawer 20⅛"x32"x3¾"	245 lbs.	VIRIAGE

SEE PRICE LIST IN BACK OF CATALOG

THE "SACRAMENTO" DRAWING TABLE



Sacramento Drawing Table, 34 inches high with 3 inch raising blocks, with adjustable top, made in three sizes.

	Size of top	Drawers, Inside dimensions	Shipping Weight	Code Word
No. 3529 $\frac{1}{2}$ A.	36x60 in.	Tool Drawer 10 $\frac{1}{2}$ "x27 $\frac{1}{4}$ "x3 $\frac{3}{4}$ " Shallow Drawer 37"x27 $\frac{1}{4}$ "x2"	160 lbs.	VIRIALL
No. 3529 $\frac{1}{2}$ B.	36x72 in.	Tool Drawer 17 $\frac{5}{8}$ "x24"x3 $\frac{3}{4}$ " Shallow Drawer 41 $\frac{3}{4}$ "x25"x2"	190 lbs.	VIRIANT
No. 3529 $\frac{1}{2}$ C.	42x84 in.	Tool Drawer 20 $\frac{1}{8}$ "x32"x3 $\frac{3}{4}$ " Shallow Drawer 50 $\frac{5}{8}$ "x32"x2"	260 lbs.	VIRIASK

THE "FRESNO" DRAWING TABLE



Fresno Drawing Table, 34 inches high with 3 inch raising blocks, with adjustable top, made in two sizes.

	Size of top	Drawers, Inside dimensions	Shipping Weight	Code Word
No. 3530B.	36x72 in.	Tool Drawers 17 $\frac{5}{8}$ "x25"x3 $\frac{3}{4}$ " Shallow Drawer 37 $\frac{3}{8}$ "x25"x2"	245 lbs.	VIRTAL
No. 3530C.	42x84 in.	Tool Drawers 20"x32"x3 $\frac{3}{4}$ " Shallow Drawer 42 $\frac{1}{4}$ "x32"x2"	285 lbs.	VIRTAMI

SEE PRICE LIST IN BACK OF CATALOG

THE "STANFORD" DRAWING TABLE



Stanford Drawing Table, 34 inches high with 3 inch raising blocks, with adjustable top.

	Size of Top	Drawers, Inside Dimensions	Shipping Wt.	Code Word
No. 3531A.	36x60 in.	Tool Drawer—10½"x27¼"x3¾" Shallow Drawer—37"x27¼"x2" 4-Drawer Unit—10¼"x23"x3⅞"	230 lbs.	VIRTIN

THE "BERKELEY" DRAWING TABLE



Berkeley Drawing Table, 34 inches high, with 3 inch raising blocks, with adjustable top, made in two sizes.

	Size of Top	Drawers, Inside Dimensions	Shipping Wt.	Code Word
No. 3532	36x72 in.	Tool Drawers, 17⅝"x25"x3¾" Shallow Drawers—37⅝"x25"x2"	350 lbs.	VISUS
No. 3533.	42x84 in.	Tool Drawers—20"x32"x3¾" Shallow Drawers—42¼"x32"x2"	440 lbs.	VISOR

SEE PRICE LIST IN BACK OF CATALOG

THE "ALHAMBRA" DRAWING AND REFERENCE TABLE



No. 3535



Drawing Board in Vertical position may be raised or lowered for standing or sitting position.



Rear view showing reference top and drawer arrangement

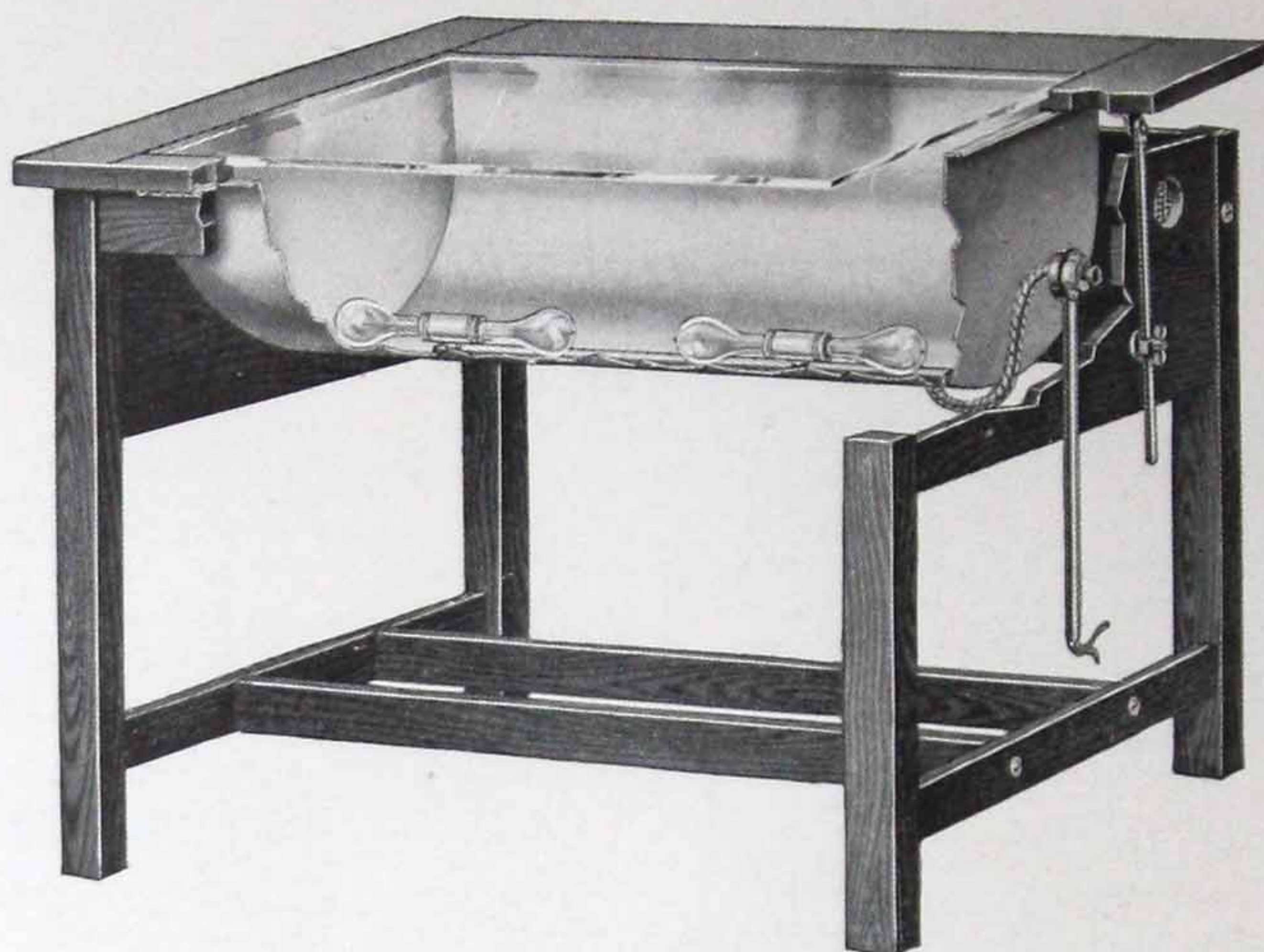
The Alhambra is a two-man table. The drawing-board top is constructed of the finest quality selected sugar pine. It may be tilted from horizontal to vertical position and securely clamped. The top is quickly and easily raised and lowered by turning the hand wheel and it stays put wherever you stop without the use of clamps or ratchets. The adjusting mechanism consists of cut-steel gears enclosed in cast iron housing. The body is built of the best grade oak with golden oak finish. The reference table top is covered with desk linoleum, banded with oak strips. It and the drawers below are for the use of the draftsman immediately ahead of the man working on the drawing board, who in turn uses the table in his rear for the same purpose. (See illustration at bottom of page).

	Size of Drawing Board	Size of Ref. Table	Drawers Inside Dimensions	Shipping Weight	Code Word
No. 3535 A	36x60 in.	36x48 in.	Large drawer, 38"x29½"x5" Two drawers, 17¾"x29½"x3½"	315 lbs.	VISO
No. 3535 B	36x72 in.	36x48 in.	Large drawer, 38"x29½"x5" Two drawers, 17¾"x29½"x3½"	325 lbs.	VISHI
No. 3535 C	42x72 in.	36x60 in.	Large drawer, 50"x29½"x5" Two drawers, 23¾"x29½"x3½"	350 lbs.	VISTA



Showing arrangement of Lietz Alhambra Drawing and Reference Tables in Drafting Room.

THE "NATOMA" ILLUMINATED TRACING TABLE



No. 3537

This table is 34 inches high with 3 inch raising blocks and has a top 36x48 inches with a plate glass tracing surface 24x36 inches set flush with the top. Reflector with aluminum finish and illuminated by 4 electric lights giving a perfect light for tracing the faintest lines on original copy and eliminating all shadows. Old blueprints and other indistinct drawings can be traced without difficulty.

Code Word

No. 3537. The "Natoma" Illuminated Tracing Table.....**VITELLUS**

THE "COLOMA" ILLUMINATED TRACING TABLE



No. 3538

The "Coloma" tracing and retouching table has a top 32x31 inches with plate glass in center 22x24 inches. The table is adjustable in height from 30 to 40 inches and may be tilted to suit conditions. The aluminum finished reflector and lights are permanently attached to the working top and give a perfect reflection of light without shadows.

Code Word

No. 3538. The "Coloma" Tracing
and Retouching Table.....**VITELMY**

SEE PRICE LIST IN BACK OF CATALOG

SECTIONAL FILING CASES

No. 3545

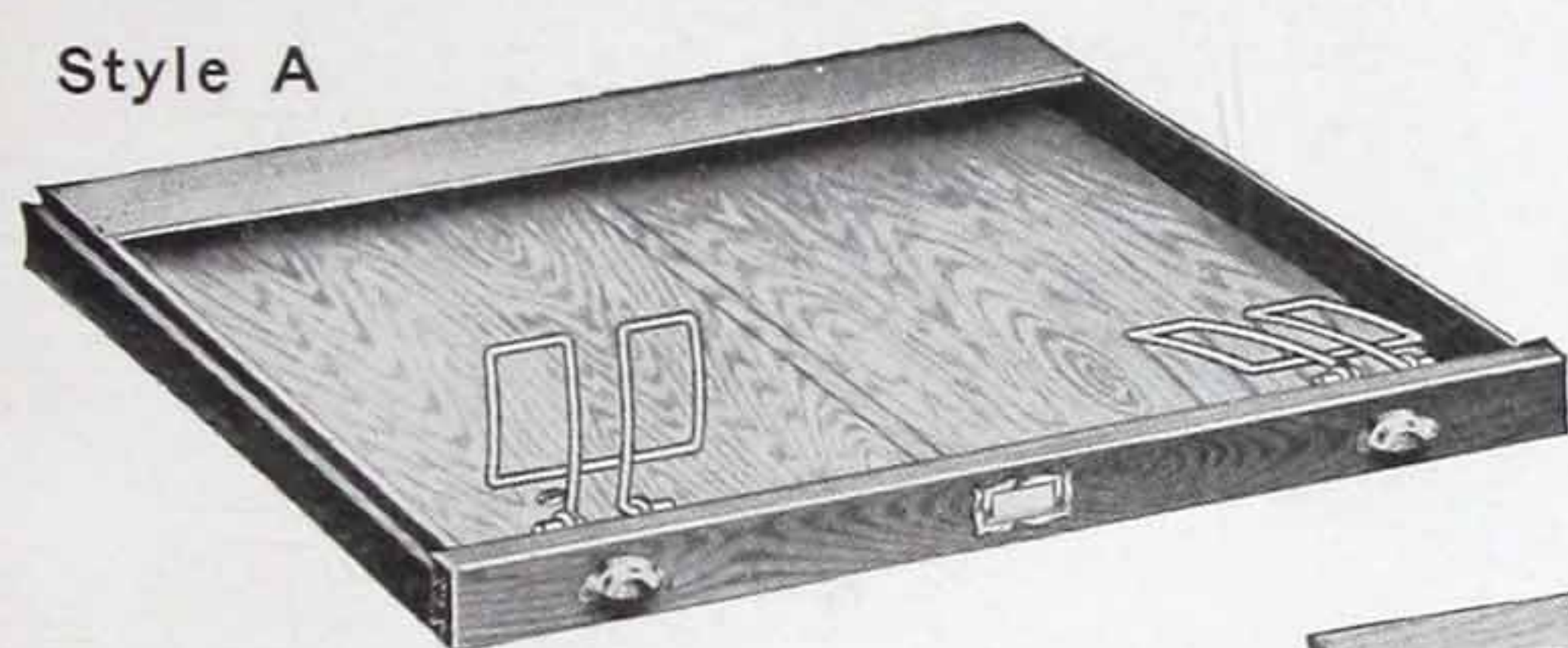
A cabinet for the protection and filing of your drawings, blue prints, specifications, maps, photographs, etc., is one of the most necessary articles of equipment in a drafting room, and the sectional style is by far the most popular, as it can be made to grow as your business grows.

It is built on the same plan as the well-known sectional bookcases, and is always made uniform in size and finish so that any number of sections, procured at different times, will fit perfectly.

Construction

These units are made of well-seasoned and thoroughly kiln-dried oak. The drawers are constructed with dovetailed joints. They slide in grooves, there being no rails between them. The back of each drawer is covered for a space of four inches with a thin strip to prevent drawings from curling up. Sections are held in place by means of a half-round projection on the back of the section, which the cuts do not show; and this fits into the upper section, and the front rails are bolted together. Bolting in this way prevents the rail from sagging and catching on the drawer below.

Style A



All units are furnished with Style A Drawers, unless otherwise specified.

Hold-down Wires not furnished unless ordered.

Style B



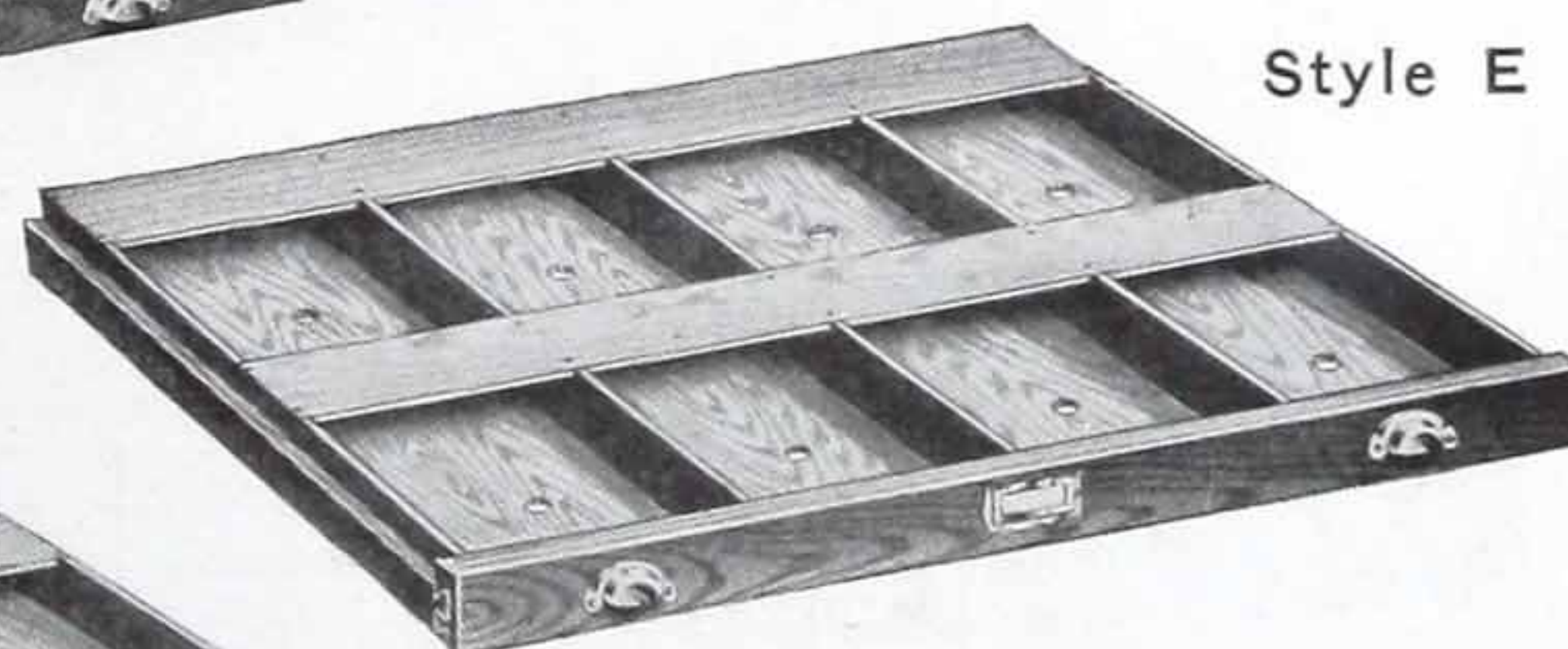
Style D



Style C



Style E



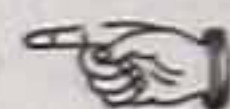
The construction of our blue print drawers has been greatly improved. The bottoms are made with two separate panels of three-ply veneer which rest in grooves in a center support. These grooves allow for contraction and expansion so that the panels will not warp. Three-ply veneer is the strongest construction known to woodworking science for drawer bottoms.

The drawers are constructed with dovetailed joints and slide in grooves, there being no rails between them. The back of each drawer is covered for a space of four inches with a thin strip to prevent drawings from curling up.

SECTIONAL FILING CABINETS



Top B



Unit A



Unit C



Unit D



Unit E



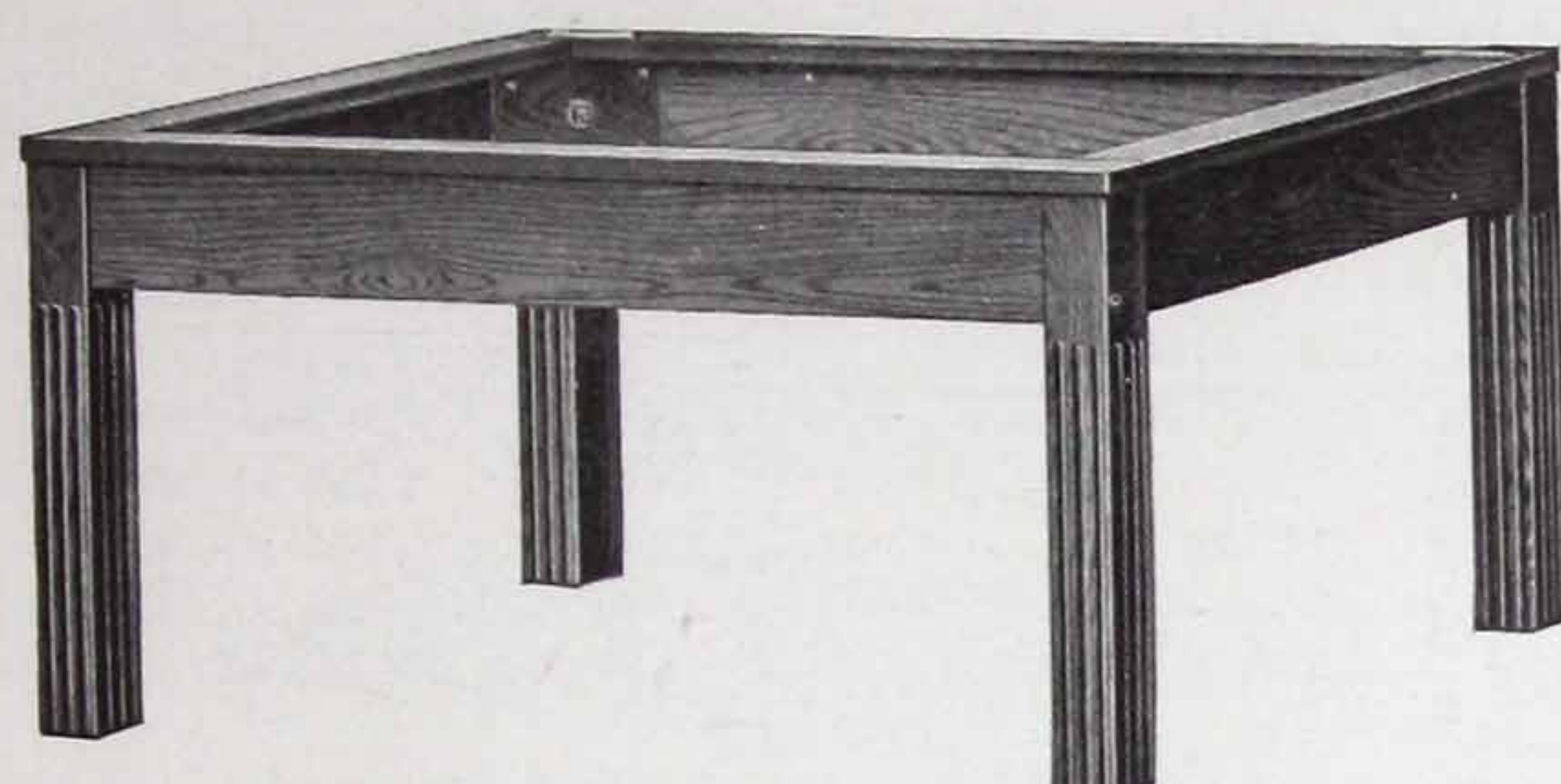
Plain Base, G



Low Sanitary Base H



SECTIONAL FILING CABINETS



High Sanitary Base J



Unit K



No. 3545. OAK SECTIONAL FILING CABINETS.

General Description

Section No.		Inside Length Inches	Width of Drawers Inches	Depth of Drawers Inches	Outside Length Inches	Width Over All Inches	Height Over All Inches	Shipping Weight Pounds	Code Word
A	Five Drawer Section with Oak Top Attached....	42 ³ / ₈	32	2	45 ¹ / ₂	34 ⁷ / ₈	15 ¹ / ₄	180	VOCAL
B	Oak Cap.....	....	..	...	45 ¹ / ₂	35	3	60	VOALIST
C	Five Drawer Section.....	42 ³ / ₈	32	2	45 ¹ / ₂	34 ³ / ₈	14 ¹ / ₂	145	VODKA
D	Three Drawer Section.....	42 ³ / ₈	32	3 ⁵ / ₈	45 ¹ / ₂	34 ³ / ₈	14 ¹ / ₂	140	VOILE
E	One Drawer Section.....	42 ³ / ₈	32	7 ¹ / ₈	45 ¹ / ₂	34 ³ / ₈	9 ³ / ₈	72	VOLANT
G	Plain Base.....	....	..	...	45 ¹ / ₂	34 ³ / ₈	4	40	VOLAPUK
H	Low Sanitary Base.....	....	..	...	45 ¹ / ₂	34 ³ / ₈	5 ³ / ₄	55	VOLATILE
J	High Sanitary Base.....	....	..	...	45 ¹ / ₂	34 ³ / ₈	22 ³ / ₄	65	VOLCANO
K	Two Drawers 20x32x37 ¹ / ₈ with Tool Tray and One Drawer 32x42 ³ / ₈ x2.....	....	..	...	45 ¹ / ₂	34 ³ / ₈	9 ³ / ₈	110	VOLLEY
T.	Flat Oak Cap (similar to cap which is attached to Section 32A)								VOLMO

SEE PRICE LIST IN BACK OF CATALOG

STEEL SECTIONAL PLAN DRAWER UNITS



These new Plan Drawer Units are fabricated to the highest standards of steel cabinet construction, and introduce many structural refinements that make them more efficient and convenient to use. A few of these features are illustrated on page 369 and described below.

ROLLERS—The drawers operate smoothly and easily on four oversize, case hardened rollers . . . an added feature that increases the service life and convenience of these units. The front two are ball bearing, assuring silent operation.

COMPRESSOR—A lift compressor at the front of the case keeps the drawings and tracings in perfect order . . . prevents curling or tearing at the edges . . . and makes it easier to refer to the individual drawings.

HARDWARE—The label holders and drawer pulls on these units are of solid bronze of attractive design.

STOPS—Gravity stops are provided for each drawer to prevent the accidental removal of the drawer.

HOOD—Each drawer is provided with a hood at the rear to prevent the tracings from curling up, becoming crumpled or torn. This feature enables you to also use the drawer to full capacity without danger of damaging tracings.

Unit Specifications TOPS

Catalog Number	Description	Outside Dimensions			Code Word
		Width	Height	Depth	
T-36X24	Top for Units 36" wide, 24" deep	41 $\frac{1}{4}$ "	1"	29"	VONA
T-42X30	Top for Units 42" wide, 30" deep	47 $\frac{1}{4}$ "	1"	35"	VONAD
T-48X36	Top for Units 48" wide, 36" deep	53 $\frac{1}{4}$ "	1"	41"	VONACK

5 DRAWER UNITS

5-36X24	5-Drawer Unit for Drawings 36" x 24"	41 $\frac{1}{4}$ "	16 $\frac{1}{16}$ "	28 $\frac{1}{2}$ "	VONALE
5-42X30	5-Drawer Unit for Drawings 42" x 30"	47 $\frac{1}{4}$ "	16 $\frac{1}{16}$ "	34 $\frac{1}{2}$ "	VONAM
5-48X36	5-Drawer Unit for Drawings 48" x 36"	53 $\frac{1}{4}$ "	16 $\frac{1}{16}$ "	40 $\frac{1}{2}$ "	VONANI

3 DRAWER UNITS

3-36X24	3-Drawer Unit for Drawings 36" x 24"	41 $\frac{1}{4}$ "	16 $\frac{1}{16}$ "	28 $\frac{1}{2}$ "	VONARK
3-42X30	3-Drawer Unit for Drawings 42" x 30"	47 $\frac{1}{4}$ "	16 $\frac{1}{16}$ "	34 $\frac{1}{2}$ "	VONASH
3-48X36	3-Drawer Unit for Drawings 48" x 36"	53 $\frac{1}{4}$ "	16 $\frac{1}{16}$ "	40 $\frac{1}{2}$ "	VONATO

1 DRAWER UNITS

1-36X24	1-Drawer Unit for Drawings 36" x 24"	41 $\frac{1}{4}$ "	8 $\frac{1}{32}$ "	28 $\frac{1}{2}$ "	VONAQUE
1-42X30	1-Drawer Unit for Drawings 42" x 30"	47 $\frac{1}{4}$ "	8 $\frac{1}{32}$ "	34 $\frac{1}{2}$ "	VONAUD
1-48X36	1-Drawer Unit for Drawings 48" x 36"	53 $\frac{1}{4}$ "	8 $\frac{1}{32}$ "	40 $\frac{1}{2}$ "	VONAVY

PLAIN BASES

PB-36X24	Base for Units 36" wide, 24" deep	41 $\frac{1}{4}$ "	4"	28 $\frac{1}{2}$ "	VONAUB
PB-42X30	Base for Units 42" wide, 30" deep	47 $\frac{1}{4}$ "	4"	34 $\frac{1}{2}$ "	VONAFT
PB-48X36	Base for Units 48" wide, 36" deep	53 $\frac{1}{4}$ "	4"	40 $\frac{1}{2}$ "	VONAX

SANITARY BASES

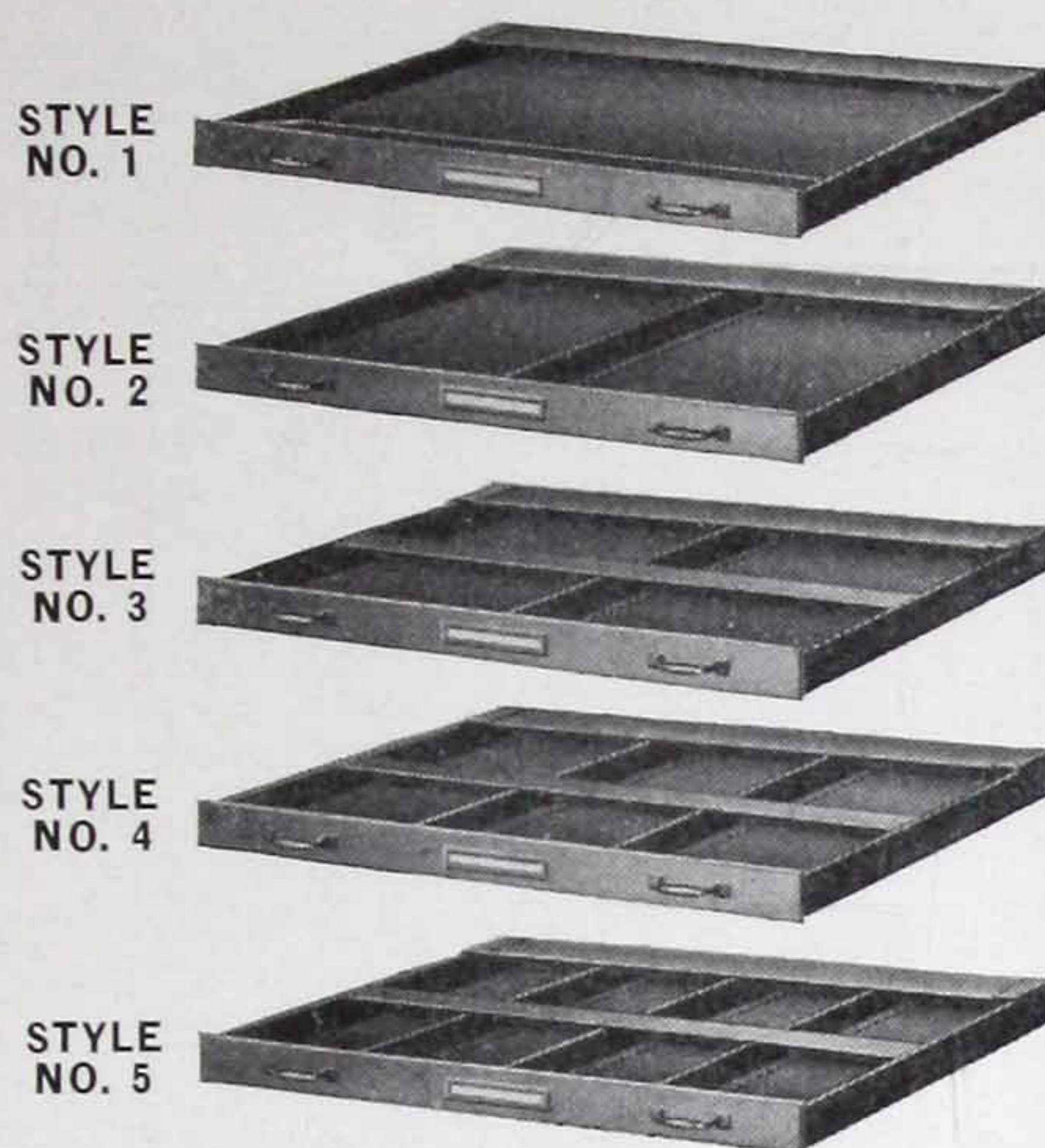
SB-36X24	Base for Units 36" wide, 24" deep	41 $\frac{1}{4}$ "	9"	28 $\frac{1}{2}$ "	VONAYL
SB-42X30	Base for Units 42" wide, 30" deep	47 $\frac{1}{4}$ "	9"	34 $\frac{1}{2}$ "	VONAZE
SB-48X36	Base for Units 48" wide, 36" deep	53 $\frac{1}{4}$ "	9"	40 $\frac{1}{2}$ "	VONAZIN

FINISH

These Sections are finished in Olive Green baked enamel. They can be furnished in Mahogany or Walnut Finish on special order and at slightly higher prices.

SEE PRICE LIST IN BACK OF CATALOG

STEEL SECTIONAL PLAN DRAWER UNITS



These cabinets are made of the highest grade furniture steel. All parts are electro-welded together assuring durability and lifetime of wear. Exceptionally rigid frames assure perfect alignment of drawers. Available in five drawer, three drawer and one drawer units. All sections are interchangeable and may be placed on top of the other. Either a sanitary or closed base may be used. Furnished in three different sizes—36"x24", 42"x30" and 48"x36".

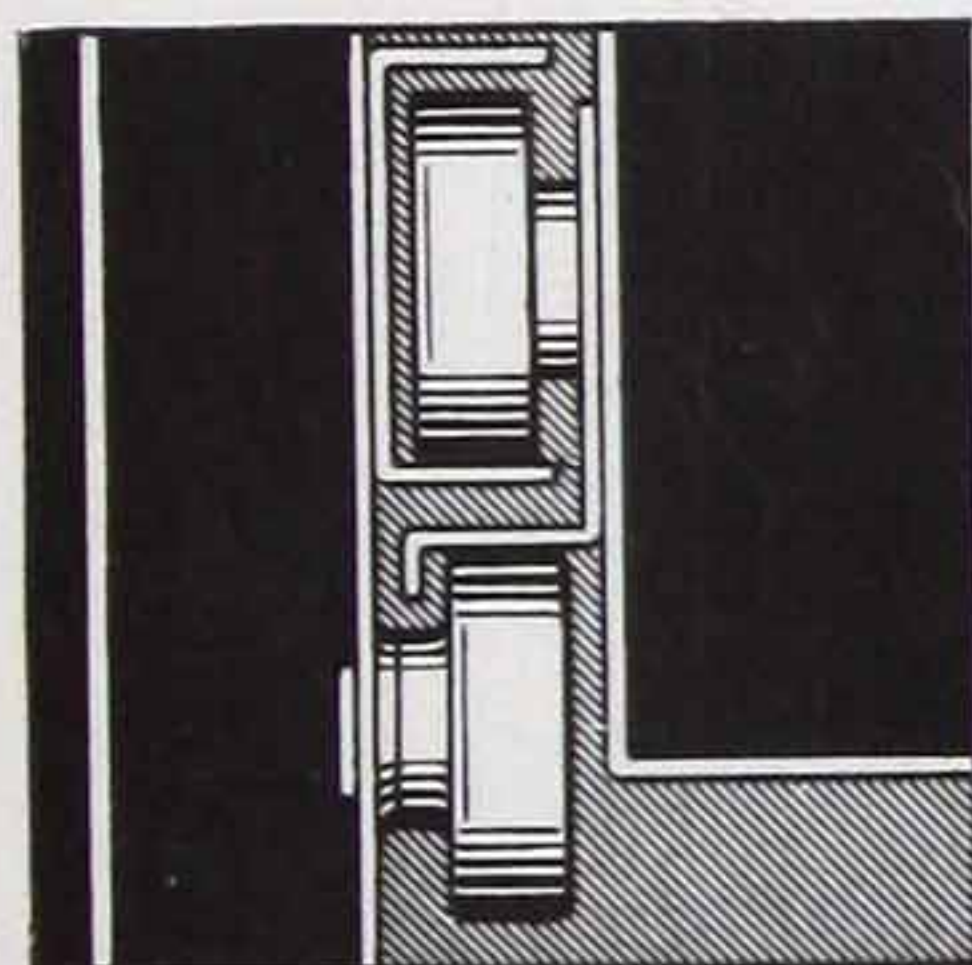
DRAWER SPECIFICATIONS

Unless otherwise specified, these units will be furnished with Style 1 drawers. When drawers with compartments are required as shown in Styles 2 to 5 inclusive, order by style number. Complete specifications follow.

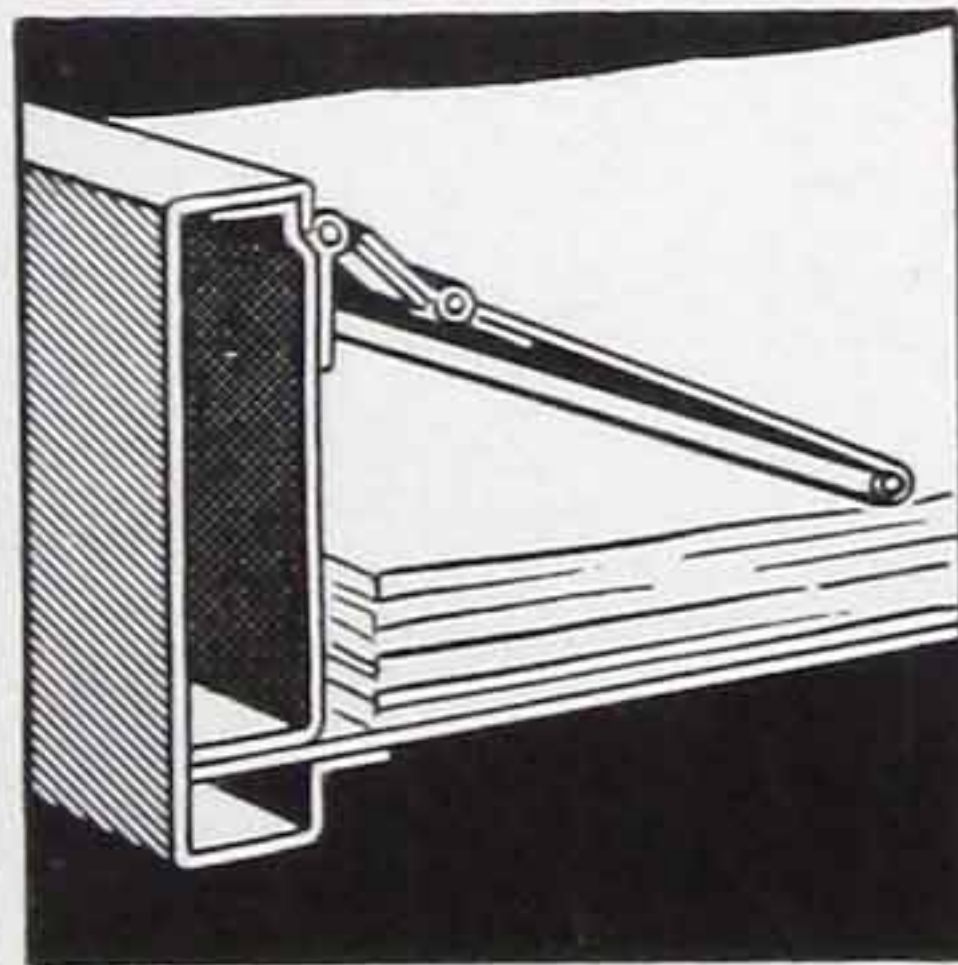
CLEAR DIMENSIONS OF EACH COMPARTMENT

Style	For Units	FIVE-DRAWER			THREE-DRAWER			ONE-DRAWER			Code Word
		Width	Height	Depth	Width	Height	Depth	Width	Height	Depth	
No. 1	36x24	37 $\frac{3}{4}$ "	17 $\frac{7}{8}$ "	26"	37 $\frac{3}{4}$ "	33 $\frac{3}{4}$ "	26"	37 $\frac{3}{4}$ "	51 $\frac{1}{8}$ "	26"	VORCA
No. 1	42x30	43 $\frac{3}{4}$ "	17 $\frac{7}{8}$ "	32"	43 $\frac{3}{4}$ "	33 $\frac{3}{4}$ "	32"	43 $\frac{3}{4}$ "	51 $\frac{1}{8}$ "	32"	VOREL
No. 1	48x36	49 $\frac{3}{4}$ "	17 $\frac{7}{8}$ "	38"	49 $\frac{3}{4}$ "	33 $\frac{3}{4}$ "	38"	49 $\frac{3}{4}$ "	51 $\frac{1}{8}$ "	38"	VORDAD
No. 2	36x24	18 $\frac{13}{16}$ "	17 $\frac{7}{8}$ "	26"	18 $\frac{13}{16}$ "	33 $\frac{3}{4}$ "	26"	18 $\frac{13}{16}$ "	51 $\frac{1}{8}$ "	26"	VORIFT
No. 2	42x30	21 $\frac{13}{16}$ "	17 $\frac{7}{8}$ "	32"	21 $\frac{13}{16}$ "	33 $\frac{3}{4}$ "	32"	21 $\frac{13}{16}$ "	51 $\frac{1}{8}$ "	32"	VORLY
No. 2	48x36	24 $\frac{13}{16}$ "	17 $\frac{7}{8}$ "	38"	24 $\frac{13}{16}$ "	33 $\frac{3}{4}$ "	38"	24 $\frac{13}{16}$ "	51 $\frac{1}{8}$ "	38"	VORRO
No. 3	36x24	18 $\frac{13}{16}$ "	17 $\frac{7}{8}$ "	12 $\frac{15}{16}$ "	18 $\frac{13}{16}$ "	33 $\frac{3}{4}$ "	12 $\frac{15}{16}$ "	18 $\frac{13}{16}$ "	51 $\frac{1}{8}$ "	12 $\frac{15}{16}$ "	VORST
No. 3	42x30	21 $\frac{13}{16}$ "	17 $\frac{7}{8}$ "	15 $\frac{15}{16}$ "	21 $\frac{13}{16}$ "	33 $\frac{3}{4}$ "	15 $\frac{15}{16}$ "	21 $\frac{13}{16}$ "	51 $\frac{1}{8}$ "	15 $\frac{15}{16}$ "	VORTED
No. 3	48x36	24 $\frac{13}{16}$ "	17 $\frac{7}{8}$ "	18 $\frac{15}{16}$ "	24 $\frac{13}{16}$ "	33 $\frac{3}{4}$ "	18 $\frac{15}{16}$ "	24 $\frac{13}{16}$ "	51 $\frac{1}{8}$ "	18 $\frac{15}{16}$ "	VORUB
No. 4	36x24	12 $\frac{9}{16}$ "	17 $\frac{7}{8}$ "	12 $\frac{15}{16}$ "	12 $\frac{9}{16}$ "	33 $\frac{3}{4}$ "	12 $\frac{15}{16}$ "	12 $\frac{9}{16}$ "	51 $\frac{1}{8}$ "	12 $\frac{15}{16}$ "	VORUSH
No. 4	42x30	14 $\frac{9}{16}$ "	17 $\frac{7}{8}$ "	15 $\frac{15}{16}$ "	14 $\frac{9}{16}$ "	33 $\frac{3}{4}$ "	15 $\frac{15}{16}$ "	14 $\frac{9}{16}$ "	51 $\frac{1}{8}$ "	15 $\frac{15}{16}$ "	VOTAD
No. 4	48x36	16 $\frac{9}{16}$ "	17 $\frac{7}{8}$ "	18 $\frac{15}{16}$ "	16 $\frac{9}{16}$ "	33 $\frac{3}{4}$ "	18 $\frac{15}{16}$ "	16 $\frac{9}{16}$ "	51 $\frac{1}{8}$ "	18 $\frac{15}{16}$ "	VOTAFF
No. 5	36x24	9 $\frac{3}{8}$ "	17 $\frac{7}{8}$ "	12 $\frac{15}{16}$ "	9 $\frac{3}{8}$ "	33 $\frac{3}{4}$ "	12 $\frac{15}{16}$ "	9 $\frac{3}{8}$ "	51 $\frac{1}{8}$ "	12 $\frac{15}{16}$ "	VOTAME
No. 5	42x30	10 $\frac{7}{8}$ "	17 $\frac{7}{8}$ "	15 $\frac{15}{16}$ "	10 $\frac{7}{8}$ "	33 $\frac{3}{4}$ "	15 $\frac{15}{16}$ "	10 $\frac{7}{8}$ "	51 $\frac{1}{8}$ "	15 $\frac{15}{16}$ "	VOTCA
No. 5	48x36	12 $\frac{3}{8}$ "	17 $\frac{7}{8}$ "	18 $\frac{15}{16}$ "	12 $\frac{3}{8}$ "	33 $\frac{3}{4}$ "	18 $\frac{15}{16}$ "	12 $\frac{3}{8}$ "	51 $\frac{1}{8}$ "	18 $\frac{15}{16}$ "	VOTICK

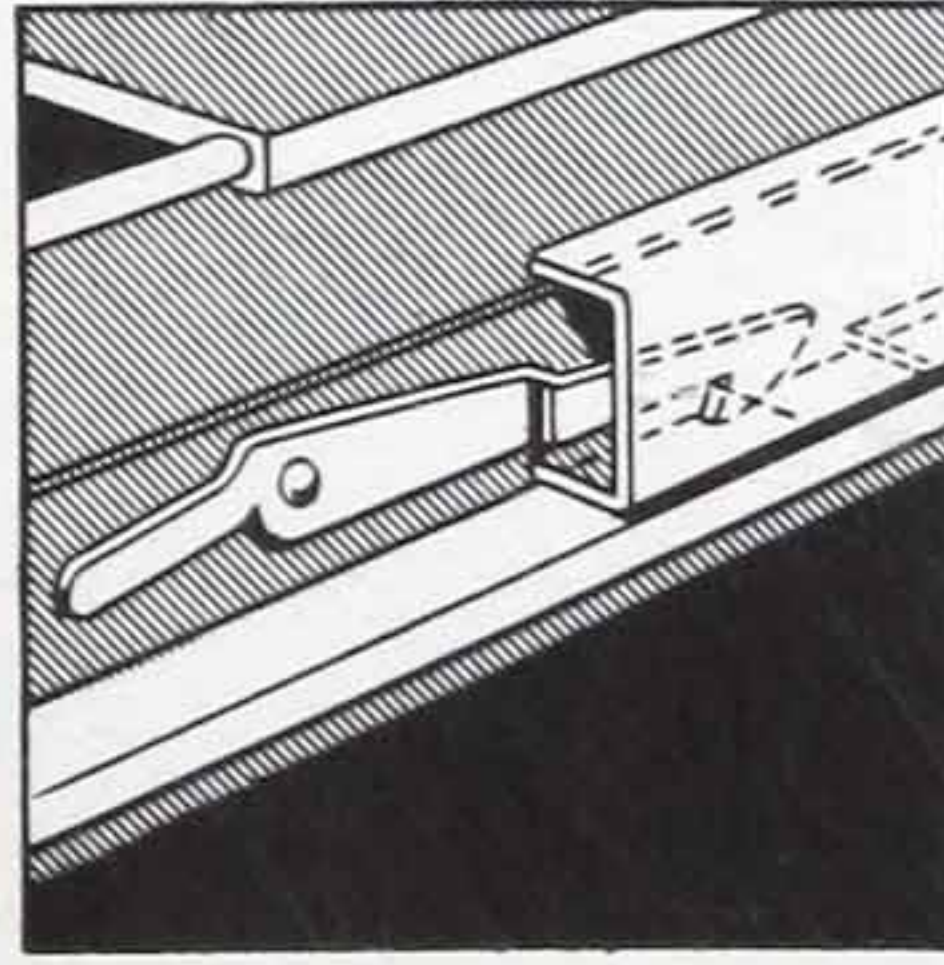
STRUCTURAL REFINEMENTS



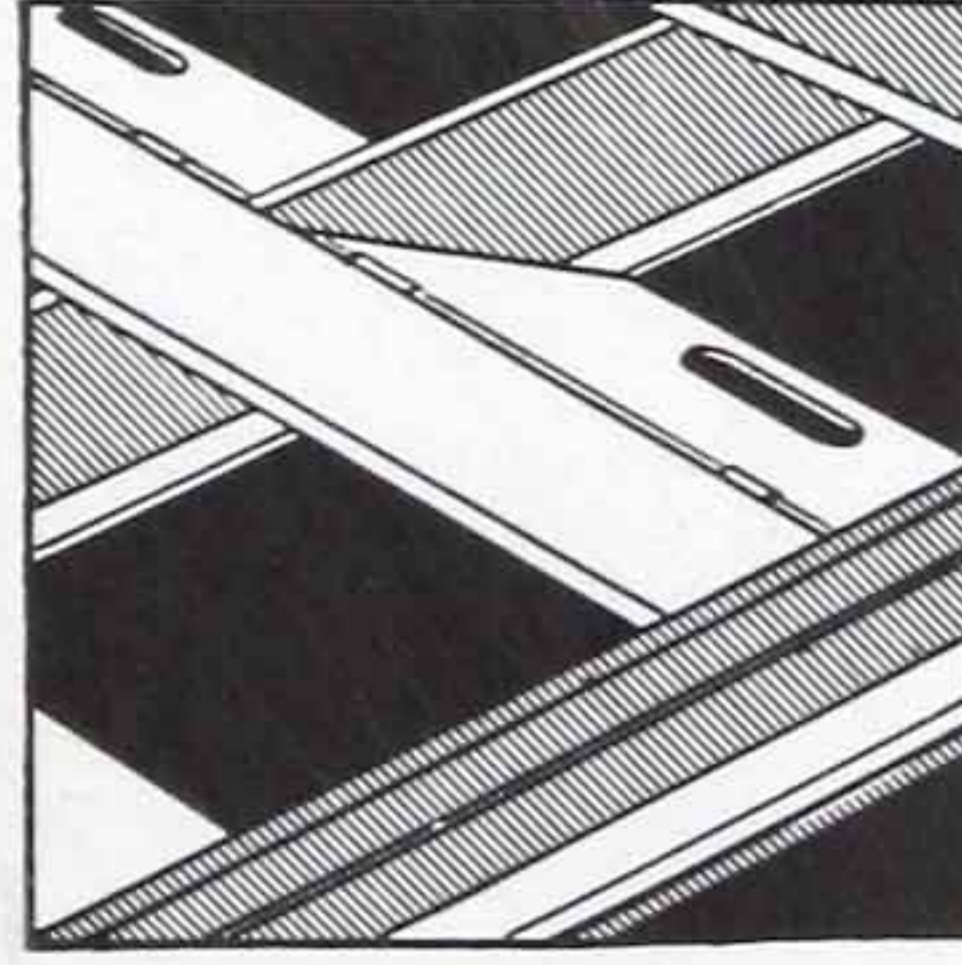
OVERSIZE
CASE HARDENED
ROLLERS



LIFT
COMPRESSOR



GRAVITY
STOPS



REAR
HOOD

SEE PRICE LIST IN BACK OF CATALOG

SCHOOL DRAWING TABLES



No. 3509

These are usually built to order to meet the requirements of the School Board and the instructor. We have had wide experience in the building of such equipment and will appreciate the opportunity to quote on your requirements. The illustration is of our school drawing table No. 3509, a very popular table. It has a sloping adjustable top 28x36 inches, 6 separate tool drawers with regular drawer locks, and 1 large drawing board compartment to hold 6 drawing boards and T-squares, without lock on door. Special locks and master key can be supplied if required. Table constructed of oak with drawing board top.

No. 3509. School Drawing Table, 40 inches high with adjustable top 28x36 inches.
....Code Word, **VOWEL**

STUDENTS' WORK BENCH



No. 3520

Built for use in schools, these work benches are also useful in the home or garage. These work benches are usually built to order after any specifications. The illustration is of our work bench No. 3520 constructed of strong maple, frame 32 inches high, top 58x23 inches, with tool tray. Wood tail vice and front vice (rapid acting or regular).

No. 3520. Students' Work Bench.....Code Word **VOYOLO**

SEE PRICE LIST IN BACK OF CATALOG

DRAFTSMEN'S STOOLS



No. 3579A



No. 3580



No. 3581



No. 3583A

STEEL STOOLS

We recommend our steel stools Nos. 3579 and 3583 as they are practically indestructible. They are offered at very attractive prices.

Code Word



No. 3579B

- No. 3579A.** Steel Stool 30 inches high, with wood seat..... **WAIF**
- No. 3579B.** Same as No. 3579A but fitted with wood back rest..... **WAIGY**
- No. 3583A.** Steel Stool, adjustable in height from 27 to 33 inches, wood seat..... **WAILER**
- No. 3583B.** Same as No. 3583A but fitted with wood back rest..... **WAILO**

WOODEN STOOLS

- No. 3580.** Finished hardwood stool, 30 inches high..... **WAIN**
- No. 3581.** Finished hardwood stool, adjustable in height from 27 to 33 inches..... **WAIVER**
- No. 3582.** Finished hardwood stool, adjustable in height from 31 to 35 inches, with circular foot rest..... **WALLET**

FELT STOOL COVERS

- No. 3585.** Brown Felt Stool Covers..... **WALLOW**

Felt Stool Covers save the clothes and prevent shine on the trousers. Should be on every stool.

EVER-HOLD AUTOMATIC ADJUSTABLE STOOLS



The Ever-Hold Automatic Stools are adjustable in height any fraction of an inch up to ten inches. It requires only an instant to adjust the stool to the desired height. To raise the seat, merely lift up on the seat top. It will remain automatically locked at any desired height. To lower the seat, raise the seat to the full height and then push it down until bottom of seat rests on the pedestal. No tools are required as the operation is completely automatic for any desired adjustment. Fitted with 13½" hardwood seats, they can be obtained with or without Body-Form Back Rests.

- No. 3586A.** Ever-Hold Automatic Stool, adjustable range 20 to 30 inches..... **WALLUDE**
- No. 3586B.** Same as No. 3586A but fitted with Body form back rest..... **WALLUCK**
- No. 3587A.** Ever-Hold Automatic Stool, adjustable range 25 to 35 inches..... **WALLUFT**
- No. 3587B.** Same as No. 3587A but fitted with Body form back rest..... **WALLUNG**
- No. 3588.** Foot-Rest for Ever-Hold Stools..... **WALLUP**
- No. 3589.** Rubber Slip-on seat cover..... **WALLURD**

SEE PRICE LIST IN BACK OF CATALOG

DRAWING BOARD, LIBRARY PASTES AND GLUE



- No. 3600. Higgins' Drawing Board and Library Paste. In glass screw-capped jars.
Each.....

3 oz.	6 oz.	Pint
-------	-------	------
- No. 3605. Higgins' Office Paste. In glass screw-capped jars with spreader. Each.....

3½ oz.	Pint
--------	------
- No. 3612. Higgins' Vegetable Glue. In cans. Each.....

½ Pint	1 Pint
--------	--------

PARAMOUNT RUBBER CEMENT



Paramount Rubber Cement may be used either as a temporary or permanent adhesive. It is transparent, easy flowing, will not stain or injure fine fabrics and any excess cement may be rolled off with the finger tip. Used by artists, architects, lithographers and advertising agencies and for every purpose where a perfect adhesive is required.

- No. 3615. Paramount Rubber Cement in cans.

4 oz.	Pint	Quart	Gallon
-------	------	-------	--------
- No. 3616. Paramount Cement Dispenser with tight cap and adjustable brush. Capacity, 1 pint.....ea.

HIGGINS' DRAWING INKS



No. 3618



No. 3619

WATERPROOF DRAWING INK

Made in Black and the Following Colors:

Yellow	Carmin Red	Seagreen	Brick Red
Orange-Yellow	Red Violet	Green	Russet
Orange	Violet	Leaf	Brown
Orange-Red (Vermilion)	Blue	Neutral Tint	Indigo
Red (Scarlet)	Turquoise	White	

No. 3618. Higgins' Waterproof Drawing Ink, black or colors, $\frac{3}{4}$ -oz. bottle..

No. 3618HP. Higgins' Waterproof Drawing Ink, black or colors, $\frac{1}{2}$ -pint bottle.....

No. 3618P. Higgins' Waterproof Drawing Ink, black or colors, 1-pint bottle.....

No. 3618Q. Higgins' Waterproof Drawing Ink, black or colors, 1-quart bottle.....

No. 3619. Higgins' Wrico Waterproof Drawing Ink, black only, $\frac{3}{4}$ oz. bottle with improved dropper stopper.....

GENERAL DRAWING INK

The General Drawing Ink No. 3625 (black only) is soluble and is the best for India Ink tints and washes.

No. 3625. Higgins' General Drawing Ink, black only, $\frac{3}{4}$ -oz. bottle....

No. 3625HP. Higgins' General Drawing Ink, black only, $\frac{1}{2}$ -pint bottle...

No. 3625P. Higgins' General Drawing Ink, black only, 1-pint bottle....

No. 3625Q. Higgins' General Drawing Ink, black only, 1-quart bottle..

EMPTY INK BOTTLES AND CORKS WITH QUILLS



No. 3631

Doz. Each

No. 3629. Extra Dropper stoppers as furnished with Higgins' Wrico Ink No. 3619.....

No. 3630. Empty Drawing Ink Bottles, $\frac{3}{4}$ -oz., with quill filler.....

No. 3631. Extra Corks with quill fillers for Drawing Ink Bottles....

SEE PRICE LIST IN BACK OF CATALOG

PELICAN WATERPROOF DRAWING INK



Pelican Drawing Inks are absolutely waterproof. They flow freely and do not dry on the ruling pen. They allow drawing of the finest lines without breaks and are unsurpassed for brilliancy of their colors. They can be diluted with boiled water and mix with one another.

MADE IN BLACK AND THE FOLLOWING COLORS:

Scarlet, Carmine, Purple, Vermilion, Orange, Yellow, Meadow Green, Light Green, Deep Green, Cobalt Blue, Ultramarine, Prussian Blue, Indigo, Violet, Raw Sienna, Burnt Sienna, Sepia, Neutral Tint, White.

No. 3632. Pelican Waterproof Drawing Ink, 1 oz. bottle.....

No. 3632Q. Pelican Waterproof Drawing Ink, 1 quart bottle.....

PARAMOUNT WATERPROOF DRAWING INK



No. 3633

We can justly recommend PARAMOUNT BLACK WATERPROOF DRAWING INK, as the best ink obtainable on the market. It is made on entirely new principles. It is unequalled in density, yet exceptionally smooth flowing and free from any foreign matter to interfere with the smoothness of flow from the pen.

No. 3633. Paramount Waterproof Drawing Ink, black, $\frac{3}{4}$ oz. bottle.....

No. 3633HP. Paramount Waterproof Drawing Ink, black, $\frac{1}{2}$ pint bottle....

No. 3633P. Paramount Waterproof Drawing Ink, black, 1 pint bottle.....

No. 3633Q. Paramount Waterproof Drawing Ink, black, 1 quart bottle....

ETERNAL WRITING INK



No. 3634

ETERNAL BLACK. Proof against age, air, moisture, sunshine and chemical eradicators, its beautiful, lustrous black accords the utmost in dignified appearance. Widely used for records, contracts and general correspondence. Standard for penmanship classes. Excellent for fountain pens if care is taken to avoid mixing with other inks.

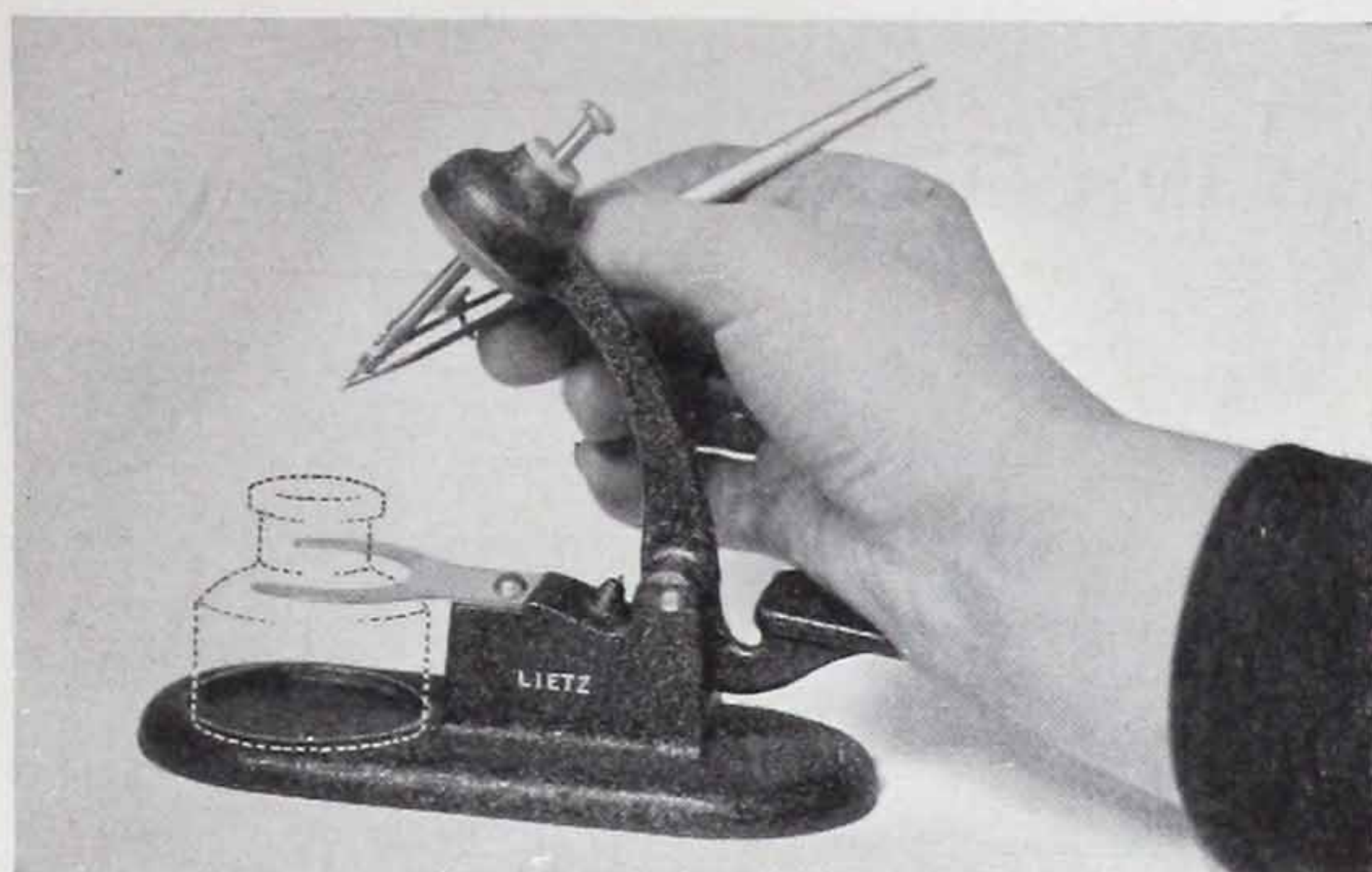
No. 3634 Higgins' Eternal Ink, 2 oz. bottle....

No. 3634HP. Higgins' Eternal Ink, $\frac{1}{2}$ pint bottle..

No. 3634P. Higgins' Eternal Ink, 1 pint bottle...

SEE PRICE LIST IN BACK OF CATALOG

INK BOTTLE HOLDERS



No. 3635

NEW DRAFTSMEN'S INKSTAND

This accessory enables the draftsman to fill his pen in the shortest possible time, and by the use of one hand alone, leaving the other at liberty to hold the T-square, triangle, etc. It will serve as a paperweight and the stand being sufficiently heavy offers a stability the need of which is so strongly felt when working without a holder for the bottle. Provided with an automatic stopper, most efficient in preventing evaporation, and the new form of dipper will instantly and positively deliver an ample and uniform charge with no tendency whatever to ink the outside of the blades. Made of cast iron, japanned.

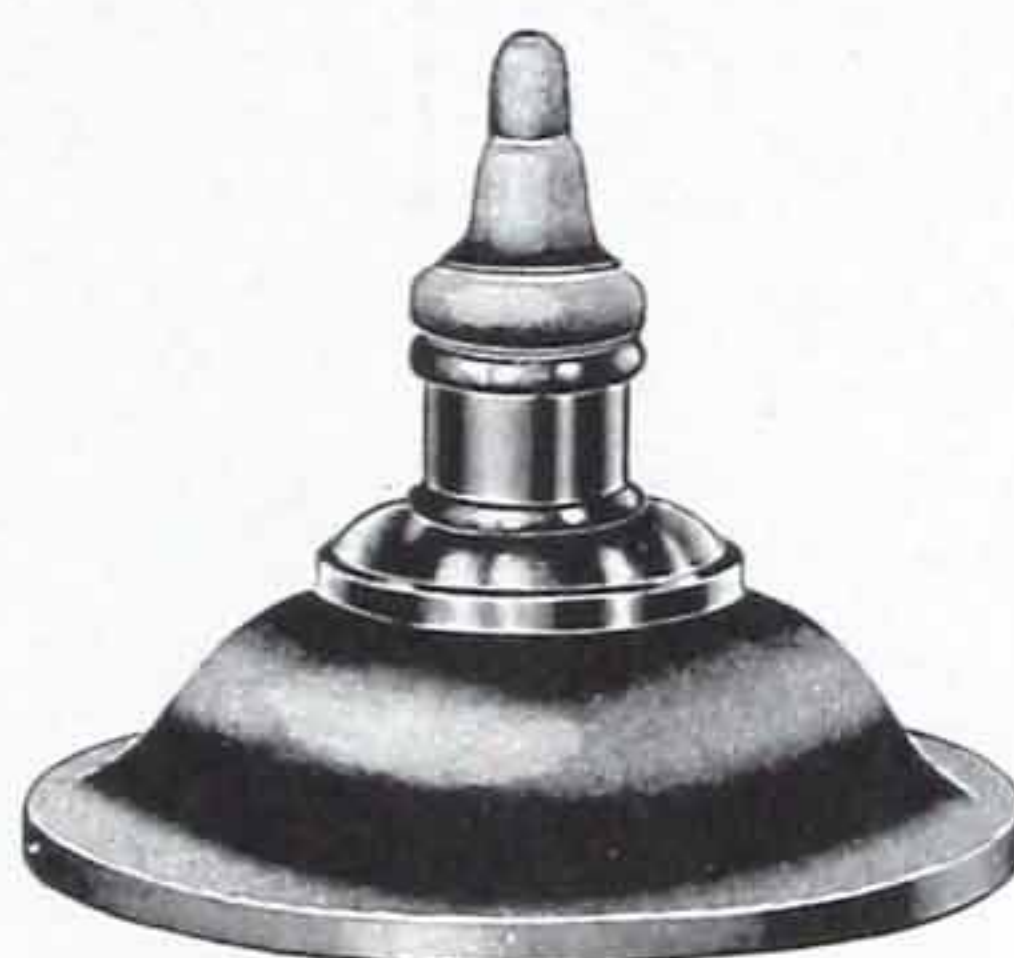
No. 3635. Improved Draftsmen's Pen-filling Inkstand with adjustable filler stem.
.....Code Word, **WHIPPER**



No. 3636

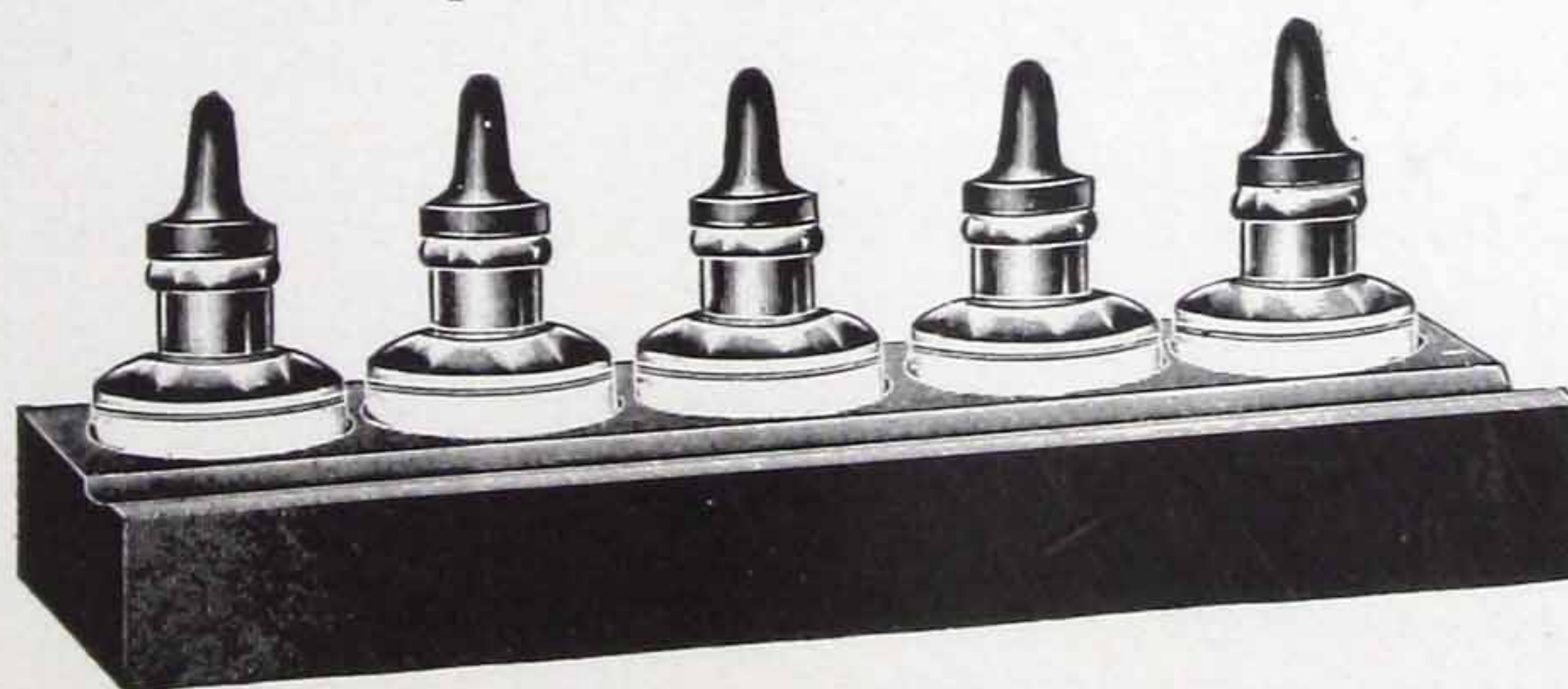


No. 3638



No. 3639

- No. 3636.** The "Clover" Ink Bottle Holder, for three bottles..Code Word **WHISKER**
No. 3638. Iron Ink Bottle Holder and Paperweight.....**WHISTLE**
No. 3639. Rubber Ink Bottle Holder, with wide base.....**WHISTMAN**
 Rubber Ink Bottle Holder No. 3639 will snugly hold any $\frac{3}{4}$ oz. ink bottle.
 Will not slide or tip.

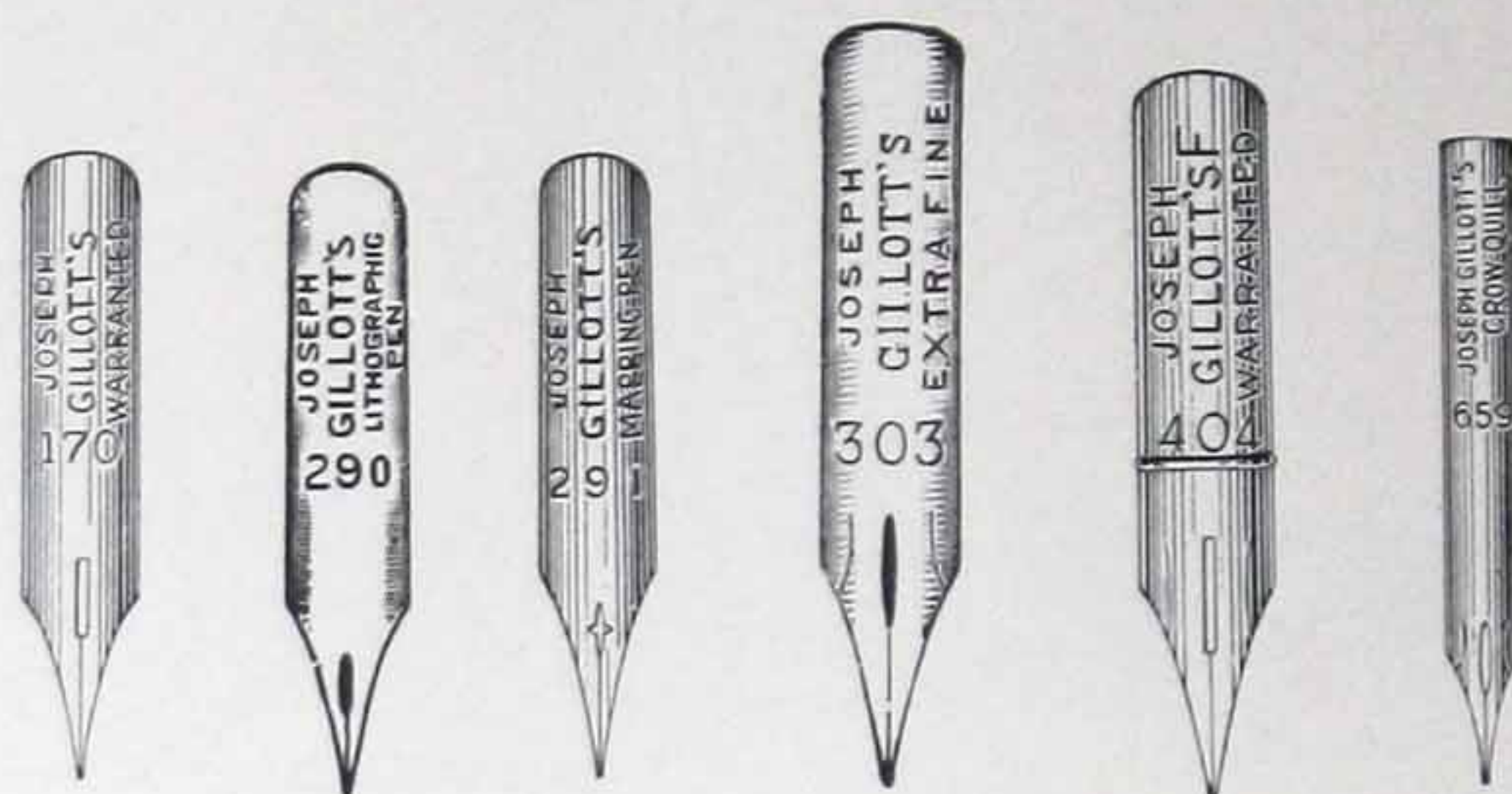


- No. 3640.** Drawing Ink Tray, for five bottles.....Code Word **WHIRLER**
SEE PRICE LIST IN BACK OF CATALOG

STEEL PENS

For Drawing and Lettering

JOSEPH GILLOTT'S STEEL PENS



In One-Gross Boxes—Pens Loose

		Gross	Doz.
No. 170.	Ladies' Pen, extra fine points.....		
No. 290.	Lithographic and Drawing Pen, superfine points.....		
No. 291.	Mapping, Drawing and Engraving Pen.....		
No. 303.	The Original Extra Fine Pen.....		
No. 404.	Public Pen with bead, fine points.....		
No. 659.	Crow Quill, superfine drawing points.....		

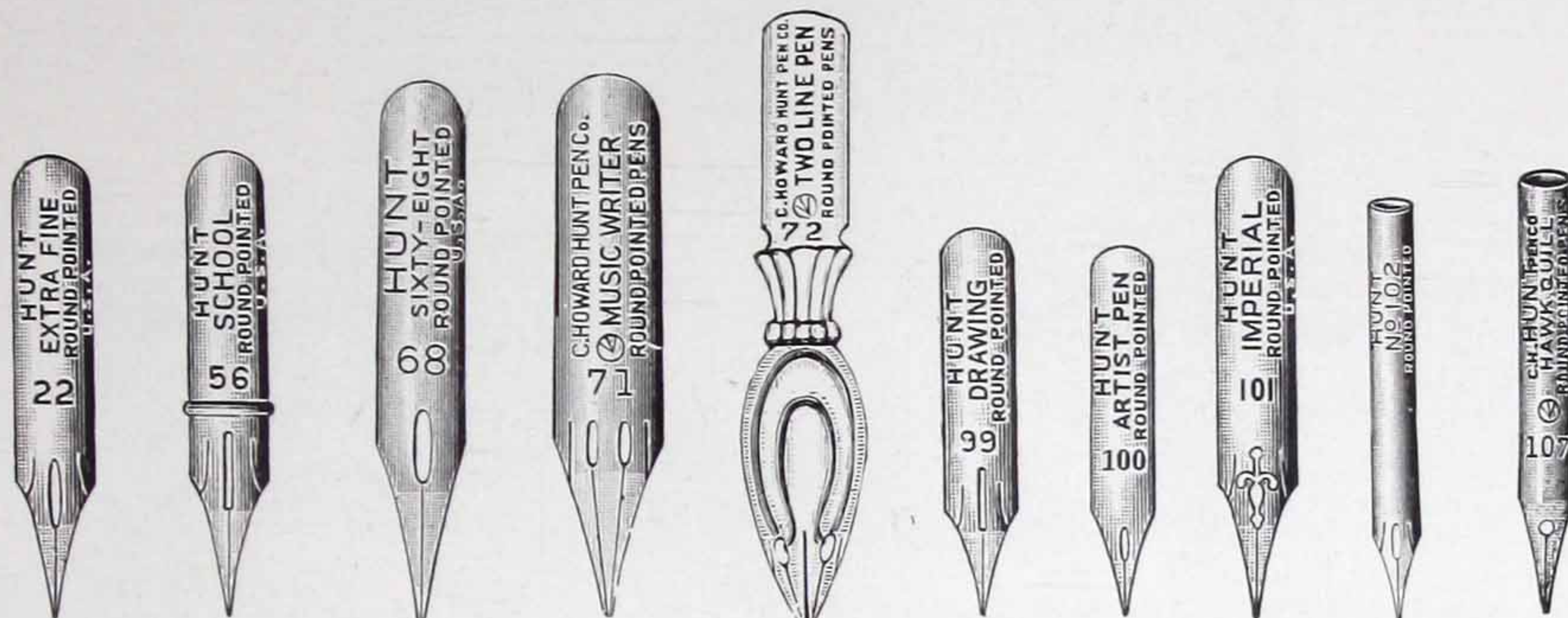


In One-Gross Boxes—12 Pens on a Card, with Penholder

		Gross	Doz.
No. 290.	Lithographic and Drawing Pen, superfine points.....		
No. 291.	Mapping, Drawing and Engraving Pen.....		
No. 659.	Crow Quill, superfine drawing points.....		
No. 850.	Long Shoulder Crow Quill, superfine points.....		
No. 1000.	Tit Quill. The finest points.....		

SEE PRICE LIST IN BACK OF CATALOG

HUNT'S AMERICAN STEEL PENS

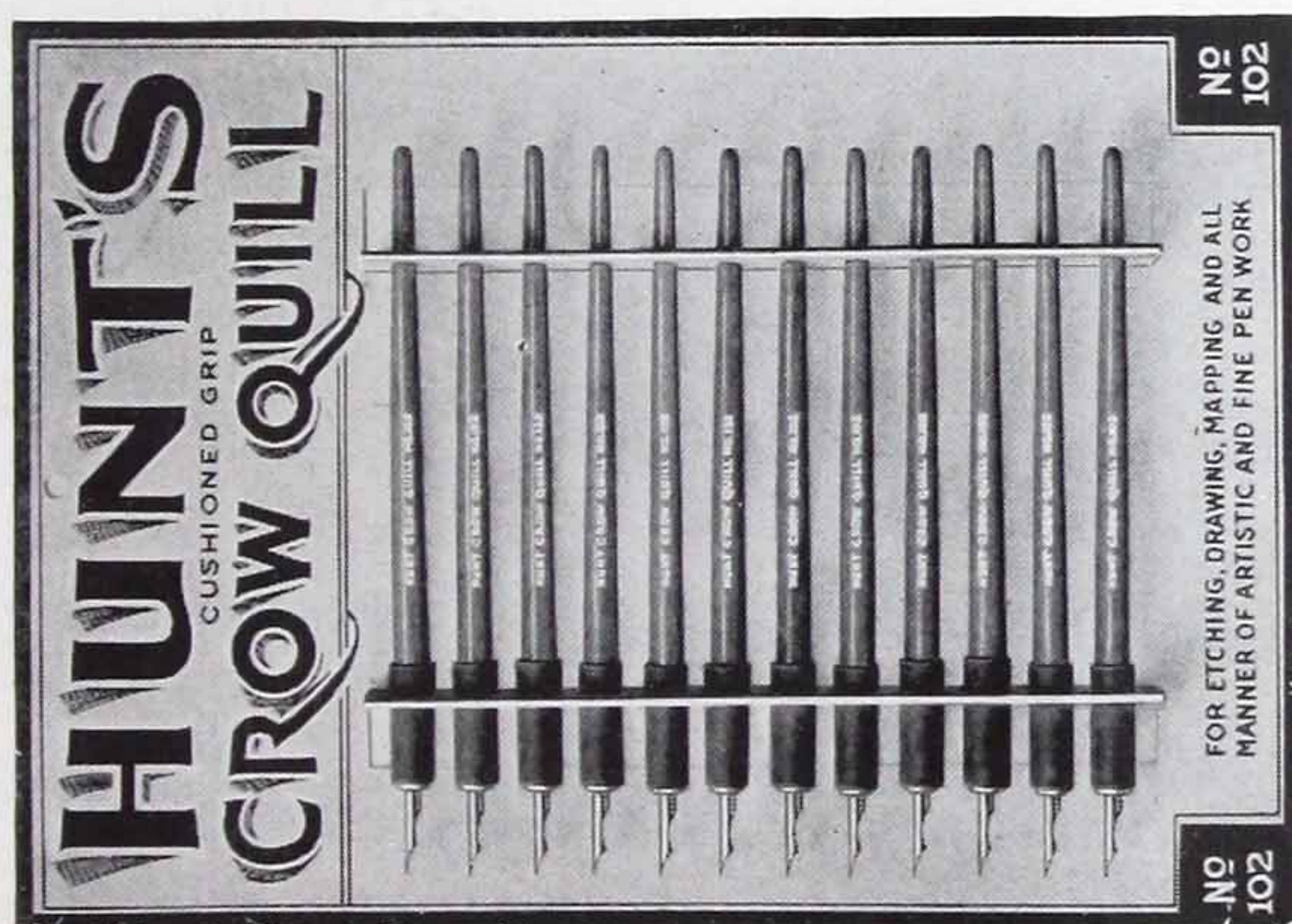


In boxes—loose.

Gross Doz.

- | | |
|----------|--|
| No. 22. | Extra Fine, for fine and ornamental writing..... |
| No. 56. | School, extra fine point, flexible action..... |
| No. 68. | Medium Point, stiff action..... |
| No. 71. | Music Writer, has two slits forming three points..... |
| No. 72. | Two-line Pens..... |
| No. 99. | Drawing, special fine point for draftsmen..... |
| No. 100. | Artist, very delicate for experts..... |
| No. 101. | Imperial, very flexible for ornamental writing..... |
| No. 102. | Crow Quill, for draftsmen and artists..... |
| No. 107. | Hawk Quill, exceeding fine but stiffer than No. 102..... |

HUNT'S PENS WITH HOLDERS



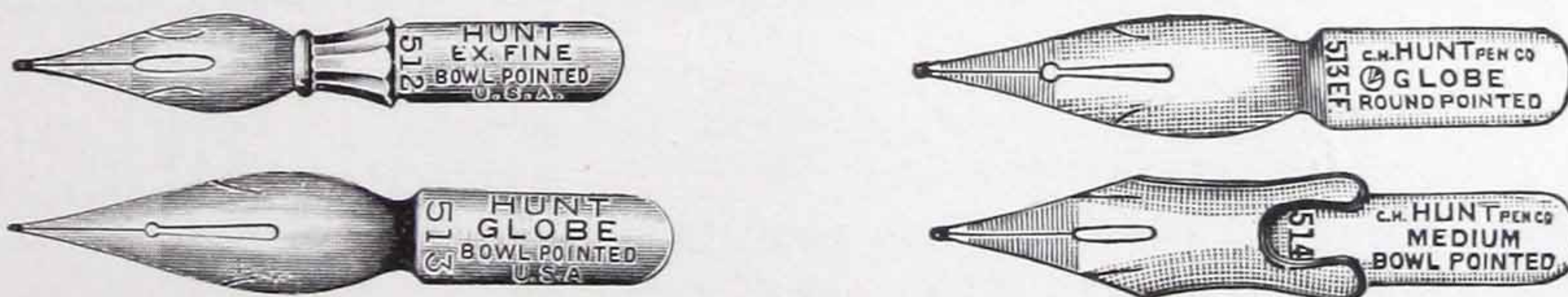
No. 102C.

Crow Quill, 12 pens, each with holder, on card. Per gross (12 cards).....
Per doz. (12 pens and holders).....
Each (1 pen and holder).....

No. 107C.

Hawk Quill, 12 pens, each with holder, on card. Per gross (12 cards).....
Per doz. (12 pens and holders).....
Each (1 pen and holder).....

HUNT'S AMERICAN BOWL POINTED PENS



Gross Doz.

- | | |
|------------|--|
| No. 512. | Bowl Point, extra fine point..... |
| No. 513. | Bowl Point, unexcelled for smoothness, fine point..... |
| No. 513EF. | Bowl Point, extra fine..... |
| No. 514. | Bowl Point, medium fine, falcon shape..... |

LEONHARDT'S BALL POINTED PENS



No. 506F



No. 516EF



No. 526

Note: F denotes Fine, EF denotes Extra Fine.

Leonhardt's Ball Pointed Pens

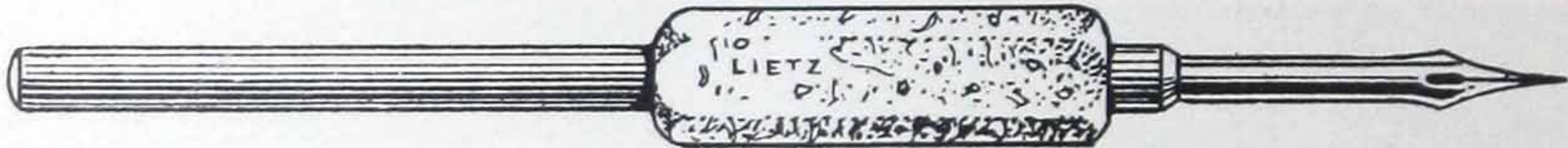
	Gross	Doz.
Nos. 506F, 506EF, 516F, 516EF and 526.....		

SPENCERIAN STEEL PENS



No. 1 College, fine point, double elastic action.	
Per gross.....	Per doz.....
No. 9 Bank, long and flexible point.	
Per gross.....	Per doz.....

CORKO CROW QUILL PENS



No. 3690

	Gross	Doz.	Each
No. 3690. Crow Quill Pens with improved holders with cork finger piece. One dozen pens and one dozen holders on card.....			

PENHOLDERS FOR GILLOTT'S AND HUNT'S PENS



No. 3695

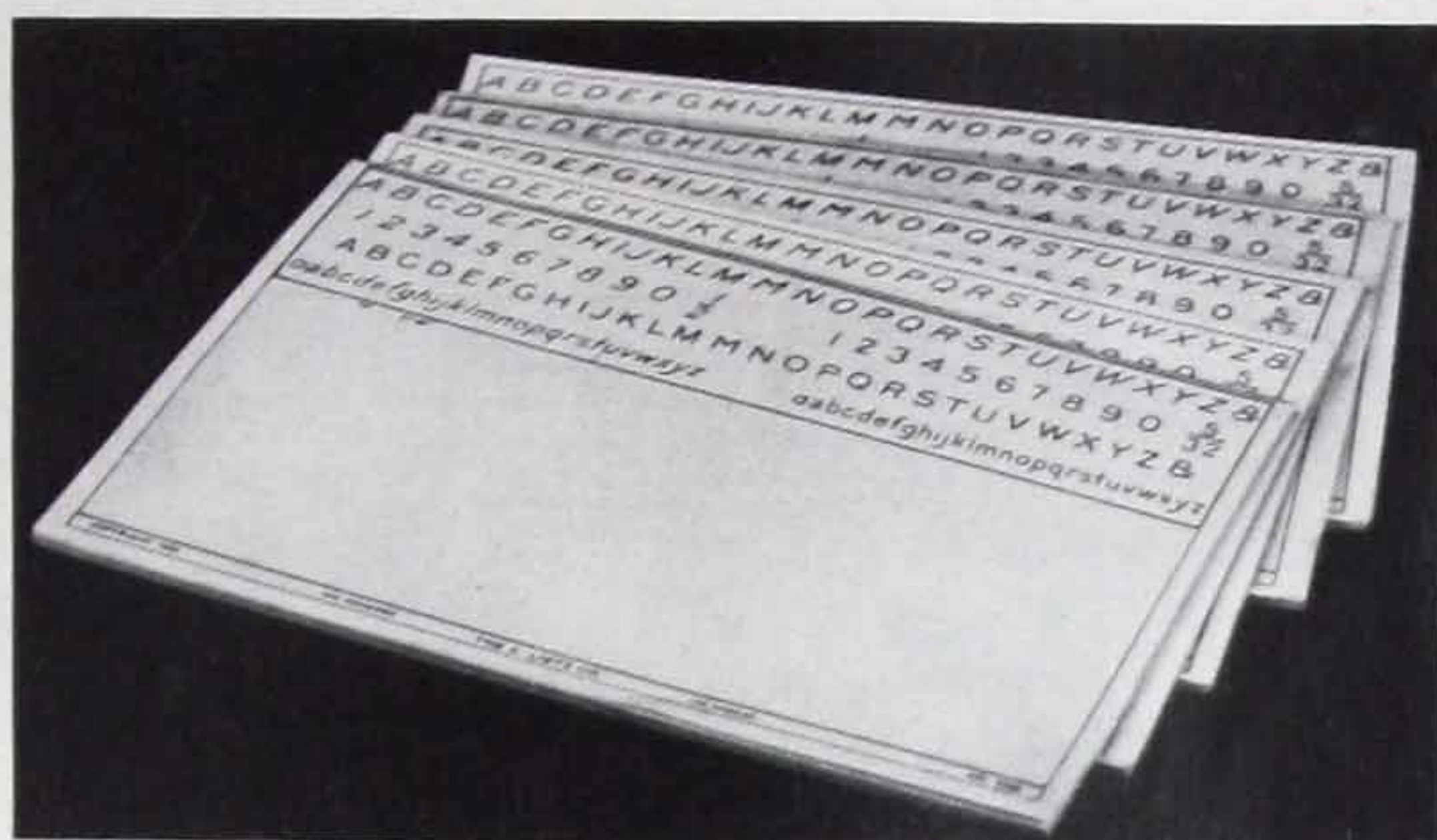


No. 3697

	Doz.	Each
No. 3695. Ebony Penholder for Crow Quill Pens, extra fine.....		
No. 3696. Ebony Penholder for Crow Quill Pens, plain.....		
No. 3697. Polished Cedar Penholder for Mapping Pens.....		

SEE PRICE LIST IN BACK OF CATALOG

LIETZ ALL-PURPOSE LETTERING PADS

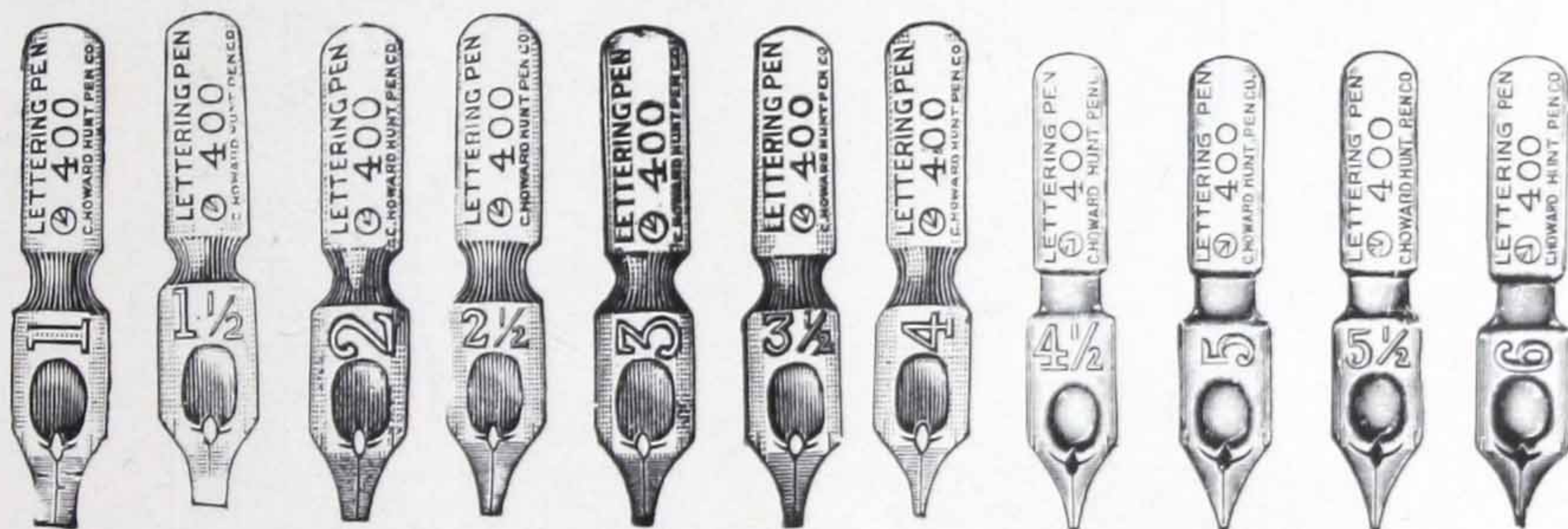


No. 3700

With the increasing demand for good, clear-cut, readable drawings and prints; better draftsmanship and lettering on mechanical working drawings is being demanded. Lietz All-Purpose Lettering Pads will help students to better prepare themselves to meet the demands of the industrial world. The pads consist of twenty sheets of good quality lettering paper, size $5\frac{1}{2}'' \times 8\frac{1}{2}''$ with examples of plain single stroke letters and numerals both slanting and vertical. Guide and slope lines indicated.

No. 3700. Lietz All-Purpose Lettering Pad.....Code Word, **WHIT**

ROUND WRITING PENS



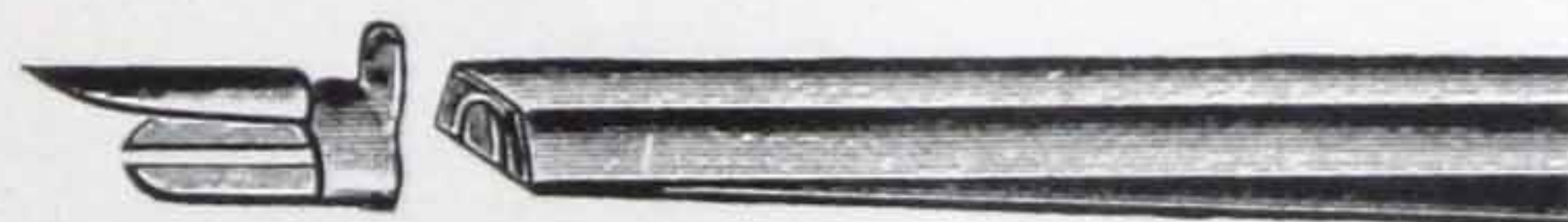
No. 3725

No. 3725. Round Writing Pens, single pointed. (Order by number.)
Gross $\frac{1}{4}$ gross Doz

Any one kind of the above Nos.....

Per Card

No. 3725C. Assortment of Round Writing Pens, one each of 11 sizes with ink reservoir.....



No. 3730

No. 3731

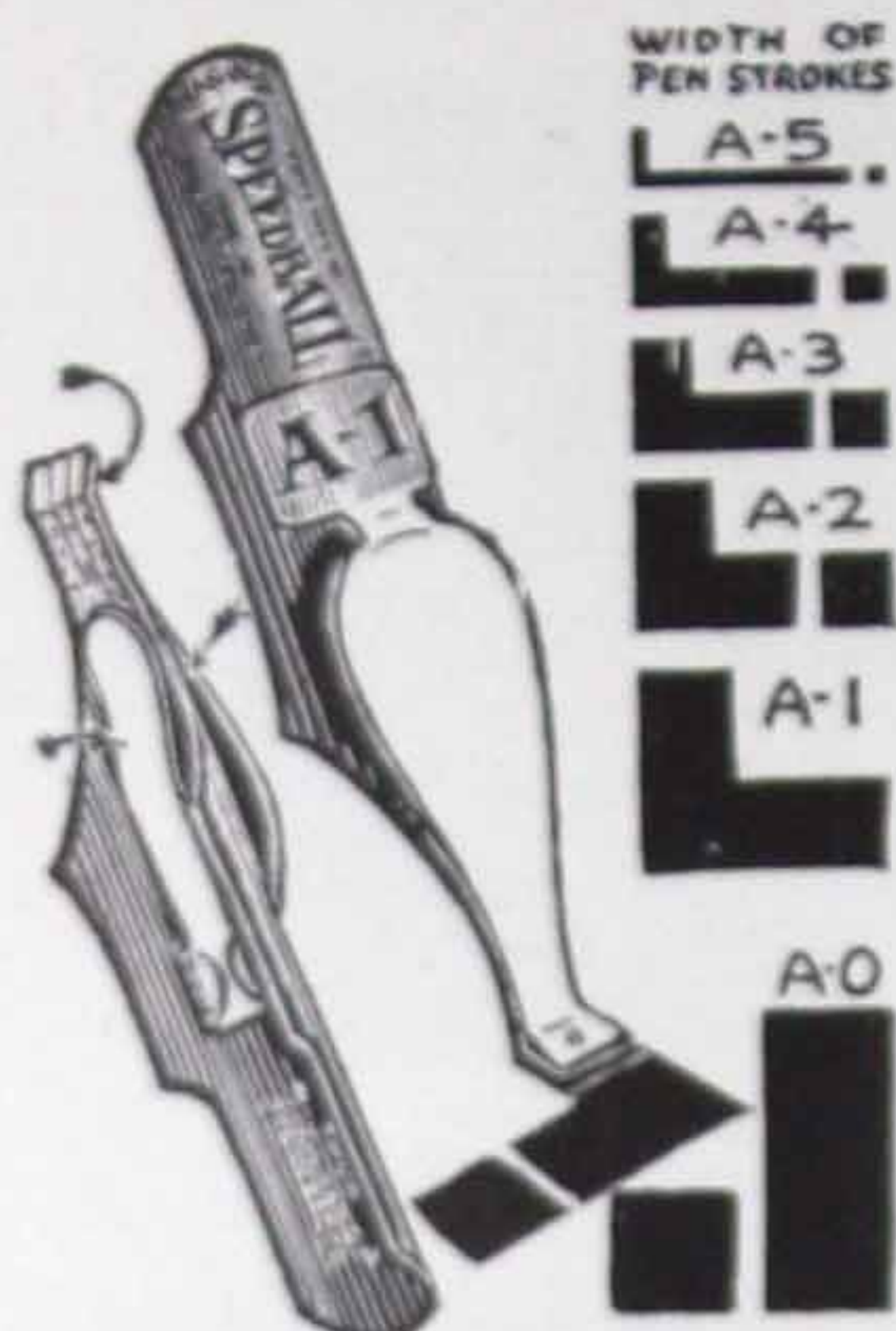
Box of 10 Each

No. 3730. Inkholders for Single and Double Pointed Pens.....

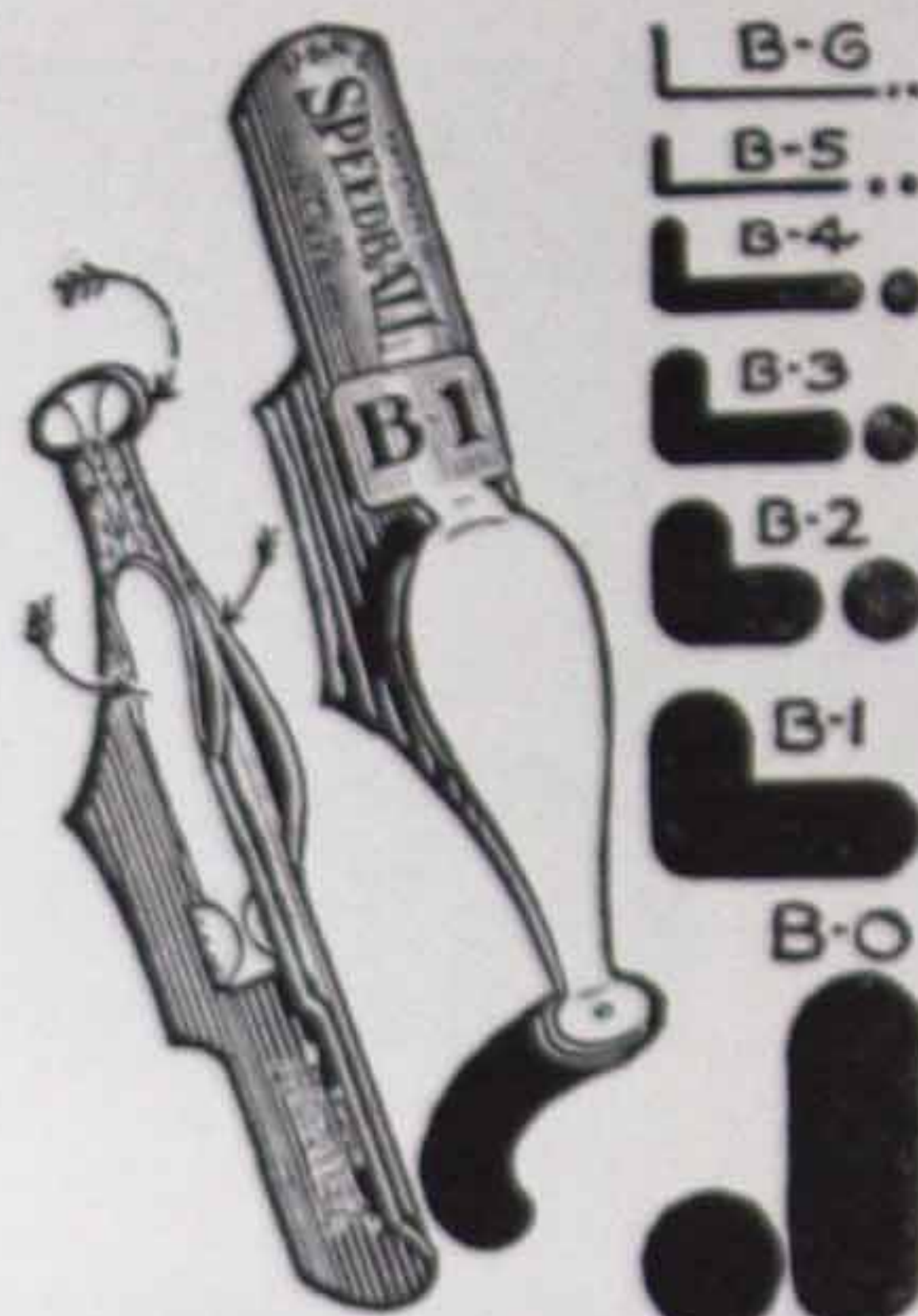
No. 3731. Penholders for Round Writing Pens, double ends....

SEE PRICE LIST IN BACK OF CATALOG

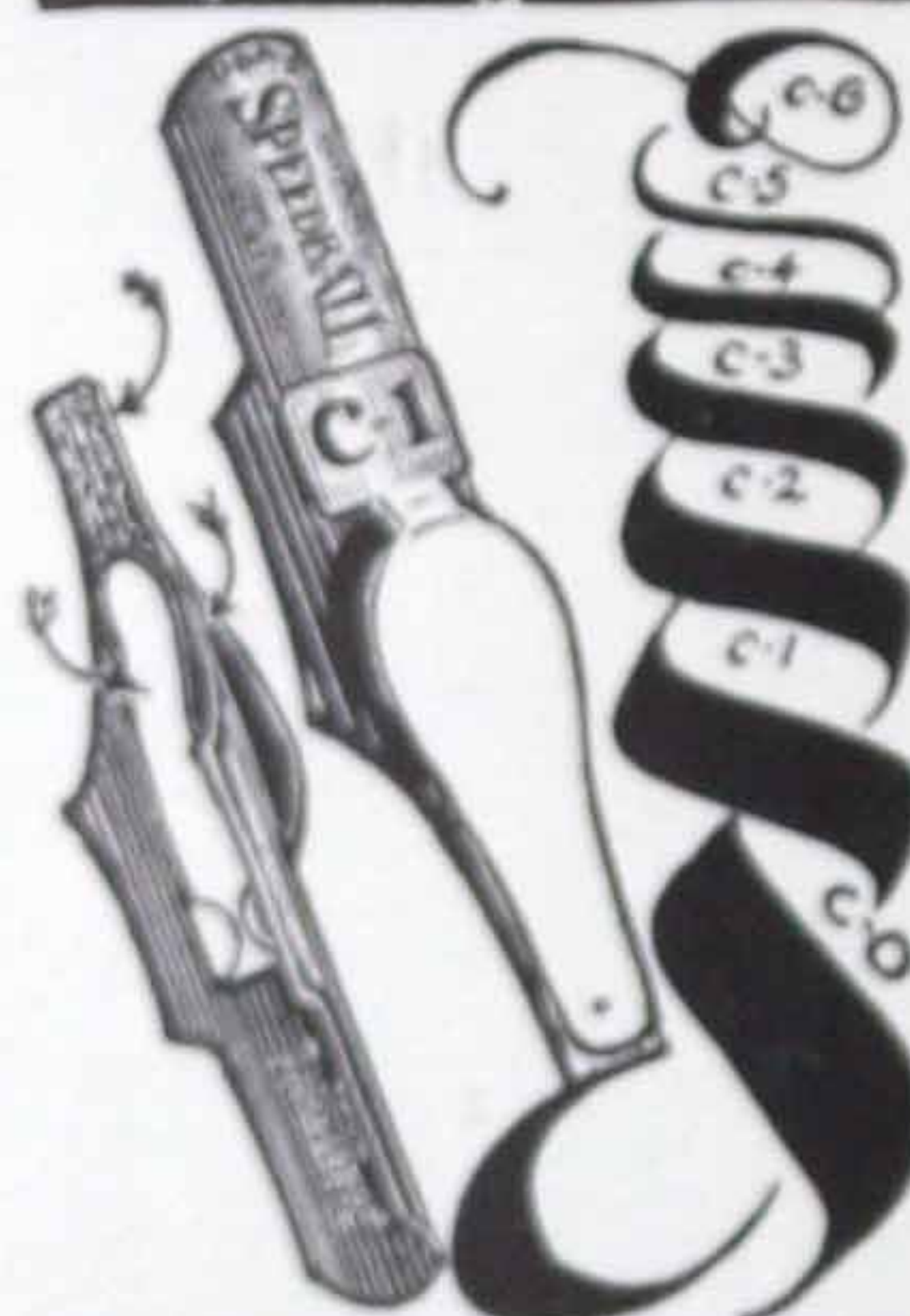
SPEEDBALL LETTERING PENS



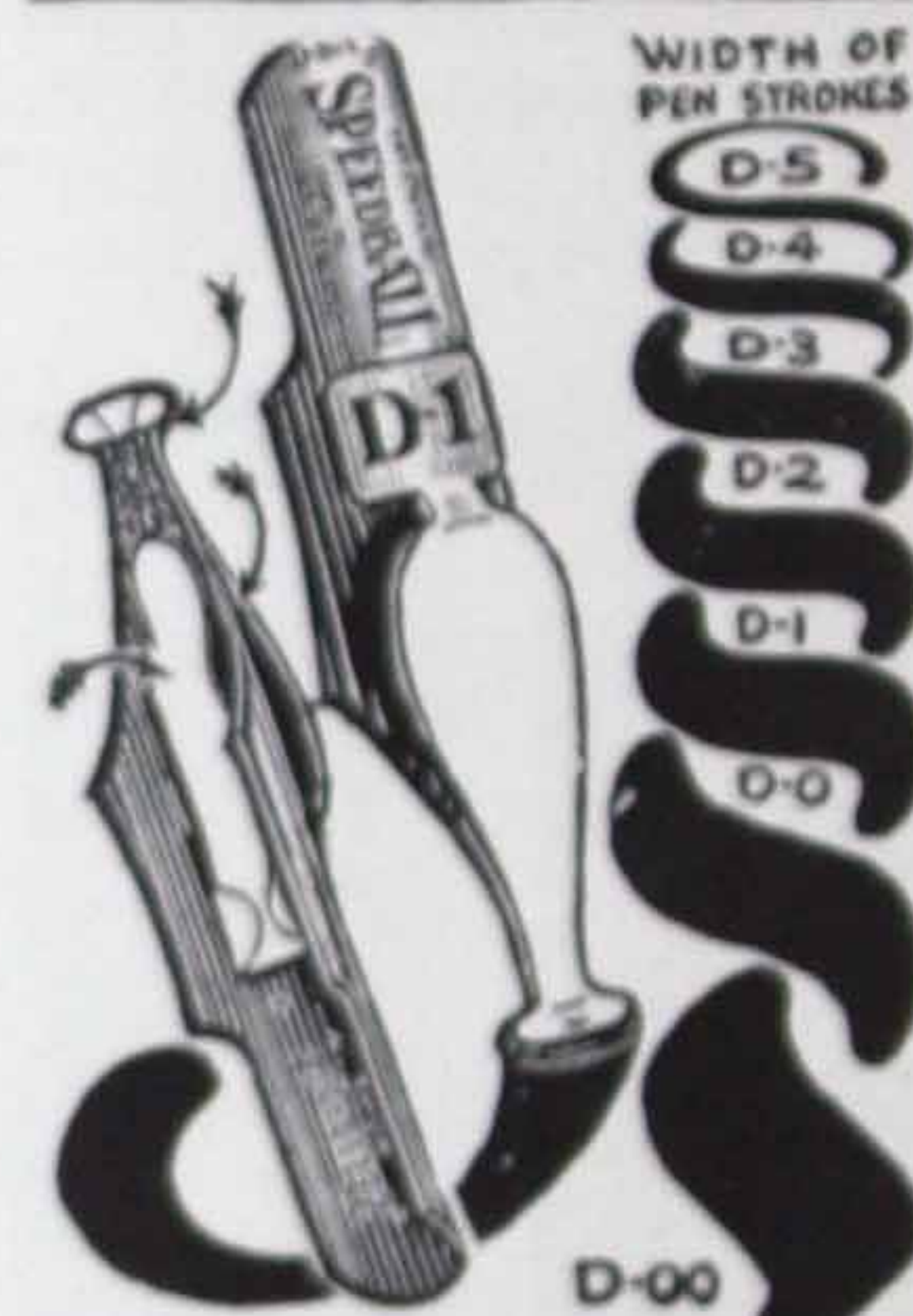
STYLE 'A' SQUARE
for Square Gothic and Block



STYLE 'B' ROUND
for Gothics or Uniform lines



STYLE 'C' OBLONG
for Roman, Text and Italics



STYLE 'D' OVAL
Bold Roman, Texts, Italics

Illustrations show thickness of line of various sizes.

The Speedball Lettering Pen produces a stroke of uniform width throughout, when drawn in any direction. To fill reservoir, simply dip in the ink like an ordinary pen.

Will work in any India ink or color diluted to flowing consistency.

	Doz.	Each
No. 3732A. Style A, sizes A-0, A-1, A-2, A-3, A-4, A-5.....		
No. 3732B. Style B, sizes B-0, B-1, B-2, B-3, B-4, B-5, B-6.....		
No. 3732C. Style C, sizes C-0, C-1, C-2, C-3, C-4, C-5, C-6.....		
No. 3732D. Style D, sizes D-00, D-0, D-1, D-2, D-3, D-4, D-5....		
Assortments		Each
No. 3732SA. Assortment, one each Style A Speedball Pen.....		
No. 3732SB. Assortment, one each Style B Speedball Pen.....		
No. 3732SC. Assortment, one each Style C Speedball Pen.....		
No. 3732SD. Assortment, one each Style D Speedball Pen.....		

SEE PRICE LIST IN BACK OF CATALOG

SPEEDBALL LETTERING OUTFITS



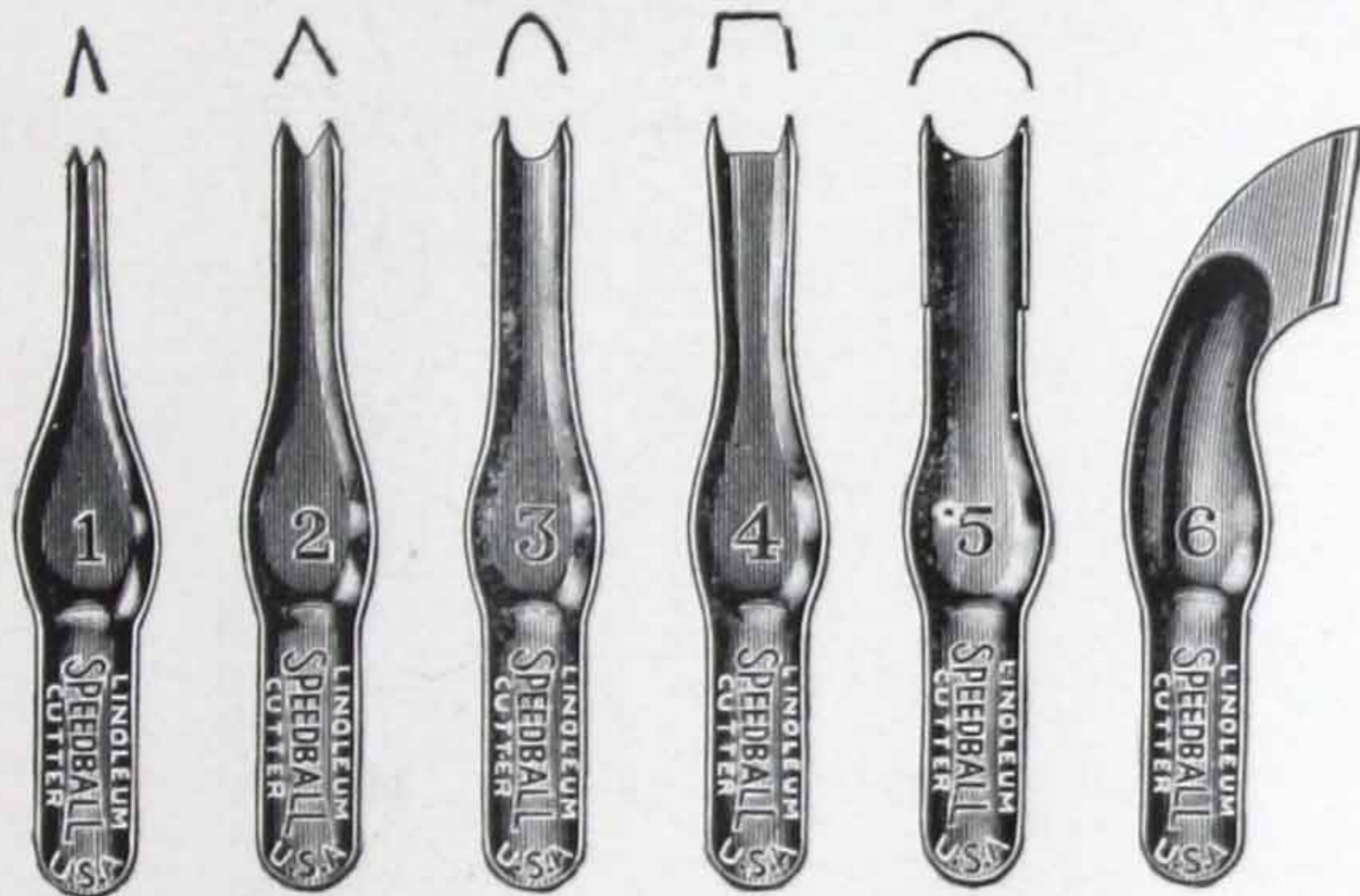
No. 3733



No. 3734

- No. 3733.** Speedball Assortment consisting of 9 assorted Speedball Pens, selected sizes in 4 styles; 1 jar black ink; 1 penholder and beginner's instruction book on pen lettering.
- No. 3734.** Speedball Assortment consisting of 25 assorted Speedball Pens in 4 styles 7 sizes; 1 jar black and 1 jar white ink; 1 penholder and large Speedball book on lettering and poster art. Also sample practice paper.

SPEEDBALL LINOLEUM CUTTERS



Linoleum Cutters are properly designed and made of specially tempered steel. They are individually hand sharpened. The handle is of sturdy construction and designed to fit the hand comfortably. A set screw and screwdriver fasten the cutter firmly so that it cannot move in the hand.

Doz. Each

- No. 3735-1.** Speedball Linoleum Cutter, Design 1.....
- No. 3735-2.** Speedball Linoleum Cutter, Design 2.....
- No. 3735-3.** Speedball Linoleum Cutter, Design 3.....
- No. 3735-4.** Speedball Linoleum Cutter, Design 4.....
- No. 3735-5.** Speedball Linoleum Cutter, Design 5.....
- No. 3735-6.** Speedball Linoleum Cutter, Design 6.....
- No. 3735H.** Extra Handles for Speedball Linoleum Cutters.....



LINOLEUM CUTTER ASSORTMENTS

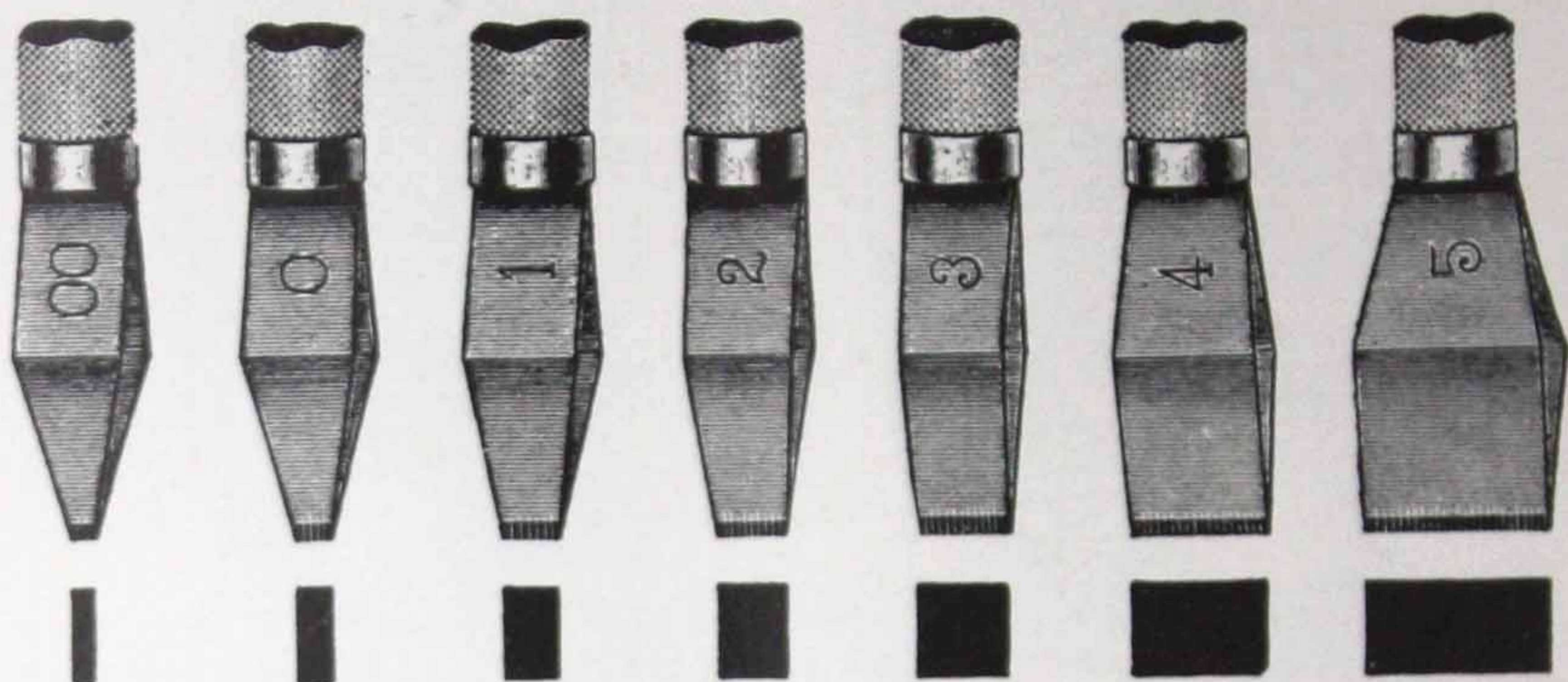
Doz. Each

- No. 3736.** Linoleum Cutter Assortment of 6 cutters and 2 handles with screwdriver in large attractive box...

SEE PRICE LIST IN BACK OF CATALOG

AUTOMATIC MARKING PENS

These Pens make a solid plain mark, full strength of the color used.



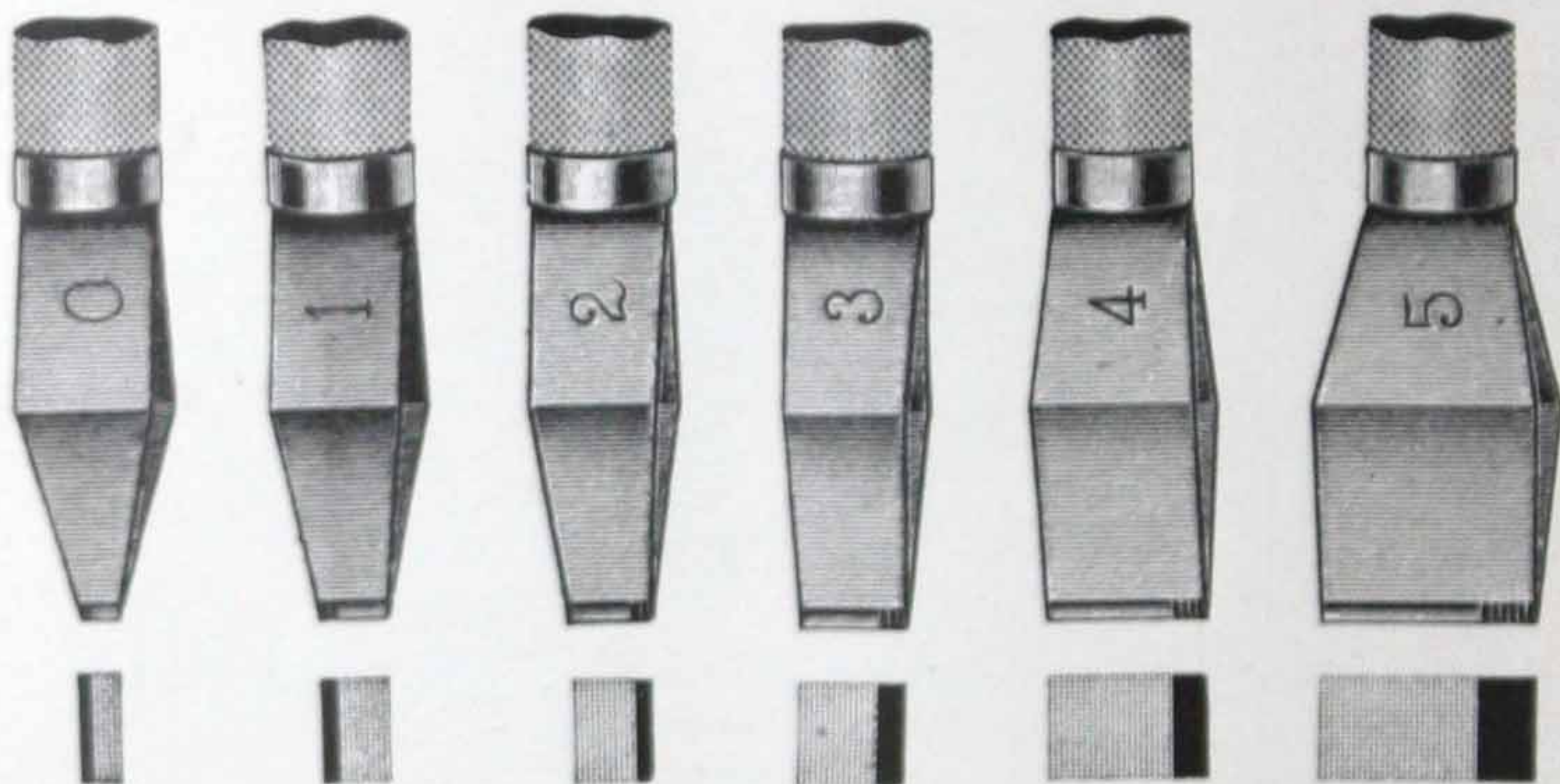
No. 3737.

Automatic Marking Pens, Nos.
00
0
1
2
3
4
5
Each

Width of Nib, inches.....
1/16
3/32
1/8
3/16
1/4
3/8
1/2

AUTOMATIC SHADING PENS

These Pens make a mark of two shades at a single stroke of the pen from one color ink.



No. 3738.

Automatic Shading Pens, Nos.
0
1
2
3
4
5
Each

Width of Nib, inches.....
3/32
1/8
3/16
1/4
3/8
1/2

BOOKS ON PEN LETTERING

No. 3739.

Practical Compendium of Commercial Pen Lettering and Designs.
Size of book 8x11 inches, 100 pages, neatly bound. 122 plates of pen alphabets, designs and show card layouts, corners, borders, scrolls with complete instructions for each
Per copy.....

For other books on lettering, see page 423.

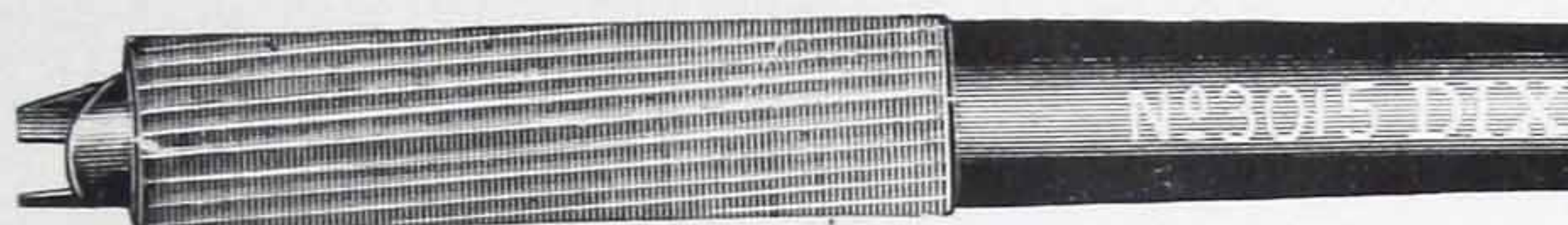
SEE PRICE LIST IN BACK OF CATALOG

PENHOLDERS



Nos. 3746-47

- | | Doz. | Each |
|---|------|------|
| No. 3746. Cedar Finish, medium size, hard rubber grip..... | | |
| No. 3747. Cedar finish, large size, hard rubber grip..... | | |



No. 3749

- No. 3749.** Fluted rubber grip, black, red or yellow finish.....



No. 3751

- No. 3751.** Cork grip, red or black finish.....

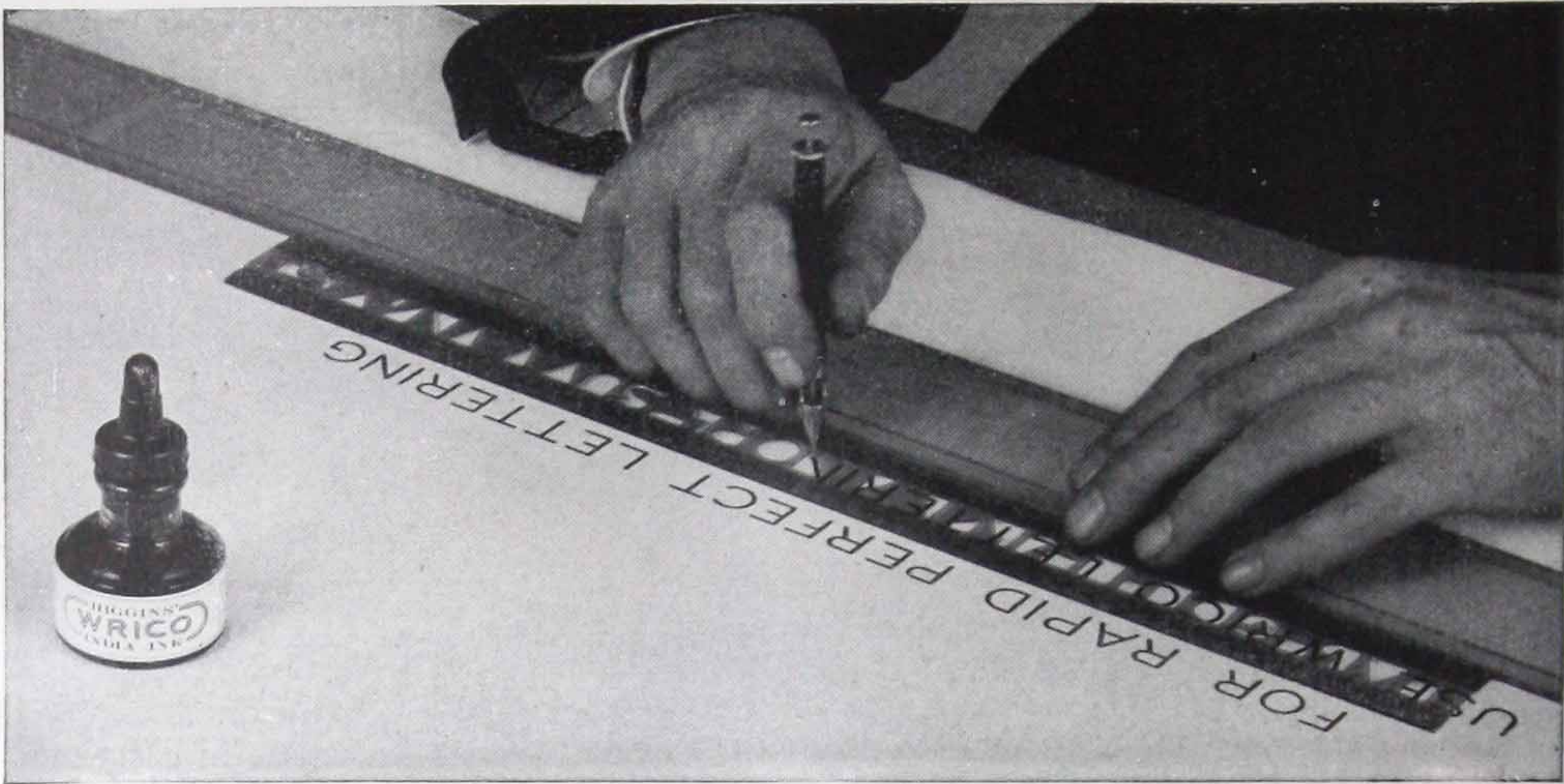


No. 3753

- No. 3753.** Flanged shape, enamel finish, various colors.....

SEE PRICE LIST IN BACK OF CATALOG

WRICO LETTERING GUIDES



Wrico Lettering Guides Will Produce Perfect Lettering with Less Effort and Greater Speed Than Any Other Lettering Device.

To use WRICO Lettering Guides effectively requires neither skill nor previous experience. No preliminary adjustments are necessary before the lettering can be done. The WRICO Lettering Pen is not a machine. It is a PEN that is held in the hand and **used in an easy and natural position.**

The Guides are grooved on the under side so that the ink will not be smeared when the Guide is moved from one character to another. The Guide is placed directly over that portion of the paper on which the lettering is to be done. This prevents distortion of the characters.

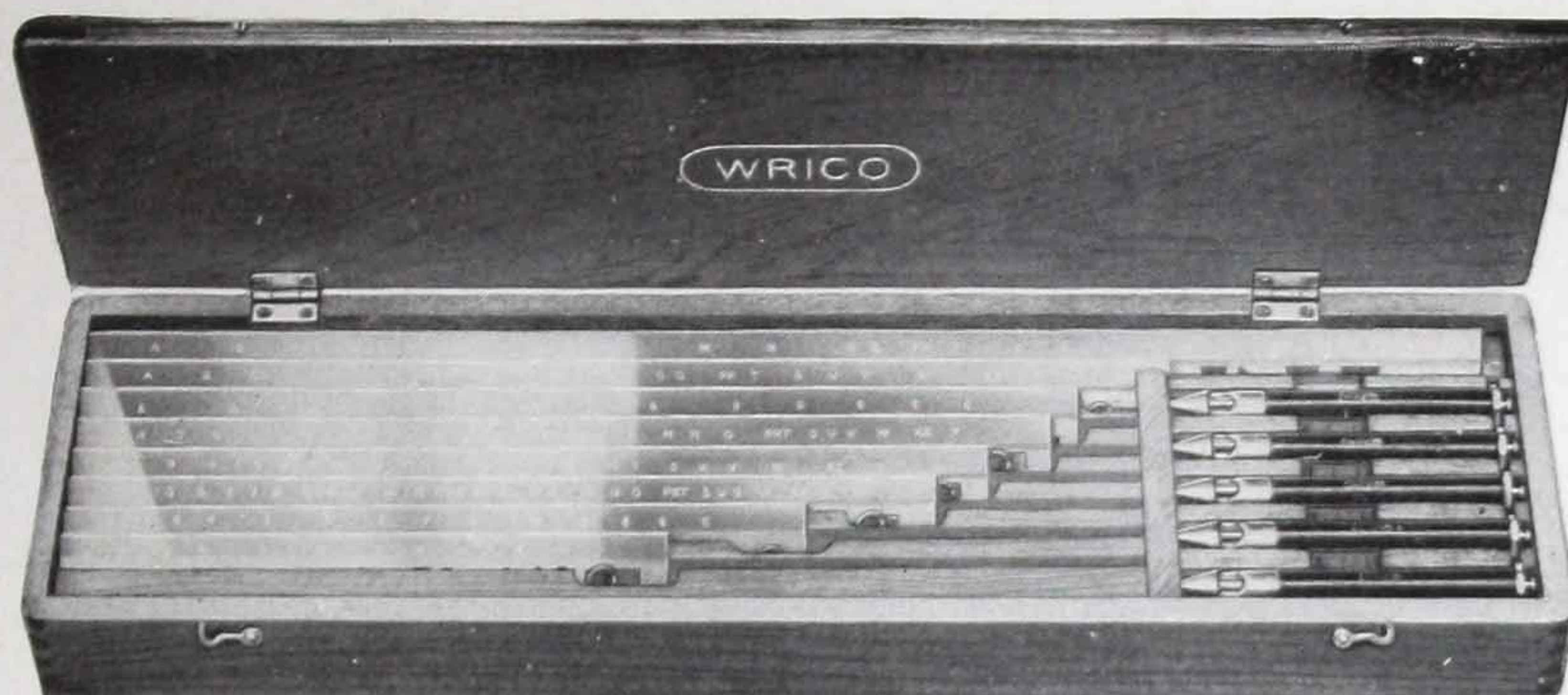
Every opening in the Guides is cut with extreme accuracy with the result that every letter, numeral or other symbol made is perfect.

It is because of the quality of the work and the economy effected by the use of WRICO Lettering Guides, that they are specified as standard equipment in almost every drafting room and office where lettering is done.

EXPLANATION OF CATALOG NUMBERS OF LETTERING GUIDES

VCN 90 stands for V ertical C apitals and N umerals.....	Height, .090"
SCN 175 stands for S lant C apitals and N umerals.....	" .175"
VC 350 stands for V ertical C apitals.....	" .350"
SN 500 stands for S lant N umerals.....	" .500"
CVC 185 stands for C ondensed V ertical C apitals.....	" .185"
CVL 250 stands for C ondensed V ertical L ower case.....	" .250"
CVN 625 stands for C ondensed V ertical N umerals.....	" .625"
EVCN 120 stands for E xtended V ertical C apitals and N umerals.....	" .120"

WRICO LETTERING GUIDES



Lettering Set No. M

COMPLETE SETS

Note:—All complete sets furnished (without extra charge) in solid mahogany cabinets. Cabinets will not be supplied except with orders for complete sets as listed below.

STANDARD VERTICAL

Wrico No.	Containing	Code Word
M	Guides Nos. VC 500, VC 350, VC240, VCN175, VN500, VN 350, VN 240, VCN 140. Pens Nos. 2, 3, 4, 5, and 6.	WHITAB
A	Guides Nos. VC 500, VC 350, VC 240, VCN 140, VN 500, VN 350, VN240, VCN140. Pens Nos. 3, 4, 5 and 6.	WHITACK
B	Guides Nos. VC 500, VC 350, VC 240, VN 500, VN 350, VN 240. Pens Nos. 3, 4 and 5.	WHITADE
E	Guides Nos. VCN 200, VCN 175, VCN 140, Pen No. 6.	WHITAF
KV	Guides Nos. VCN 120, VCN 90, Pen No. 7.	WHITAGA

STANDARD SLANT

SM	Guides Nos. SC 500, SC350, SC240, SCN 175, SC 500, SN 350, SN 240, SCN 140. Pens Nos. 2, 3, 4, 5, and 6.	WHITALL
SA	Guides Nos. SC 500, SC 350, SC240, SCN 140, SN 500, SN 350, SN 240, SCN 140. Pens Nos. 3, 4, 5 and 6.	WHITAMY
SB	Guides Nos. SC 500, SC 350, SC 240, SN 500, SN 350, SN 240, Pens Nos. 3, 4, and 5.	WHITANG
SE	Guides Nos. SCN 200, SCN 175, SCN 140, Pen No. 6.	WHITAPP
KS	Guides Nos. SCN 120, SCN 90, Pen No. 7.	WHITARN

CONDENSED VERTICAL

F	Guides Nos. CVC 625, CVC 500, CVC 375, CVN 625, CVN 500, CVN 375, Pens Nos. 2, 3, 4 and 5.	WHITASH
D	Guides Nos. CVC 250, CVC 185, CVL 250, CVL 185, CVN 250, CVN 185, Pen No. 6.	WHITATT

EXTENDED VERTICAL

EE	Guides Nos. EVCN 200, EVCN 175, EVCN 140, Pen No. 6.	WHITAYO
EKV	Guides Nos. EVCN 120, EVCN 90, Pen No. 7.	WHITAWL

SEE PRICE LIST IN BACK OF CATALOG

ACTUAL SIZE SAMPLES OF WRICO LETTERING—NUMBERS UNDER LETTERS INDICATE SIZE OF PEN USED

STANDARD VERTICAL GOTHIC

VC 500	VC 425	VC 350	VC 290	VC 240	VCN
200	175	140	120	90	

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

CONDENSED VERTICAL GOTHIC

CVC 375

CVC 500

CVC 250 CVC 185 CVC 185

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

STANDARD SLANT

SC 500

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

FC 500

ADSTYLE

FC 375

FC 250

FC 185

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z & ({ ; , ' i ?)

EXTENDED VERTICAL GOTHIC

EVCN 120

EVCN 140

EVCN 200

A B C D E F G H I J K L M N O P Q R S

OUTLINE

R R

FILLED IN

R R

SHADOW

VHC 375

VHC 500

A B C D E F G H I J K L

INDIVIDUAL WRICO LETTERING GUIDES

STANDARD VERTICAL

Wrico No.	Code Word
VC500	WIAB
VN500	WIACK
VC 425	WIADE
VN 425	WIAFT
VC 350	WIAGY
VN 350	WIAK
VC290	WIALL
VN290	WIAMO
VC240	WIA NT
VN 240	WIA PA
VCN 200	WIA RI
VCN 175	WIA SA
VCN 140	WIA TT
VCN 120	WIA VE
VCN 90	WIA X

STANDARD SLANT

SC 500	WICA
SN 500	WICAL
SC 350	WICANT
SN 350	WICASH
SC 240	WICATT
SN 240	WICER
SCN 200	WICCI
SCN 175	WICOT
SCN 140	WICEN
SCN 120	WICEST
SCN 90	WICK

EXTENDED VERTICAL

Wrico No.	Code Word
EVCN 200	WIDECK
EVCN 175	WIDEGG
EVCN 140	WIDELT
EVCN 120	WIDEN
EVCN 90	WIDEST

CONDENSED VERTICAL

CVC 625	WILAB
CVN 625	WILACK
CVC 500	WILADE
CVN 500	WILAF
CVC 375	WILAGA
CVN 375	WILAHN
CVC 250	WILAIR
CVL 250	WILAKE
CVN 250	WILALL
CVC 185	WILAMO
CVL 185	WILASH
CVN 185	WILATY

SHADOW

VHC 500	WIN
VHN 500	WINAL
VHC 375	WINART
VHN 375	WINEW
VHCN 250	WINIE

ADSTYLE

Wrico No.	Code Word
FC 500	WIPA
FN 500	WIPAT
FC 375	WIPAX
FN 375	WIPER
FC 250	WIPETA
FN 250	WIPLA
FC 185	WIPLT
FN 185	WIPLY

OUTLINE

Tab guides, 1" or
3/4", separate let-
ters and numbers. **WIRAN**
Holder for above... **WIRT**

See opposite page for actual
size samples of lettering.

Explanation of Wrico Numbers
90 stands for .090" height of
letters

175	"	"	.175"	"
350	"	"	.350"	"
500	"	"	.500"	"
VC	"	"	vertical caps	
VN	"	"	numerals	
SC	"	"	slant caps	
SCN	"	"	slant caps and numerals	

WRICO LETTERING PENS



Wrico Lettering Pens are especially designed for use with Wrico Lettering Guides. They produce perfect results with great speed and efficiency. They are furnished in 6 sizes for various widths of lines as illustrated by samples of lettering shown on opposite page.

No. 3755-2.	Wrico Pen, Size 2	Code Word	No. 3755-5.	Wrico Pen, Size 5	Code Word
No. 3755-3.	Wrico Pen, Size 3	WISACK	No. 3755-6.	Wrico Pen, Size 6	WISALL
No. 3755-4.	Wrico Pen, Size 4	WISAD	No. 3755-7.	Wrico Pen, Size 7	WISAMI
		WISAGE			WISANO

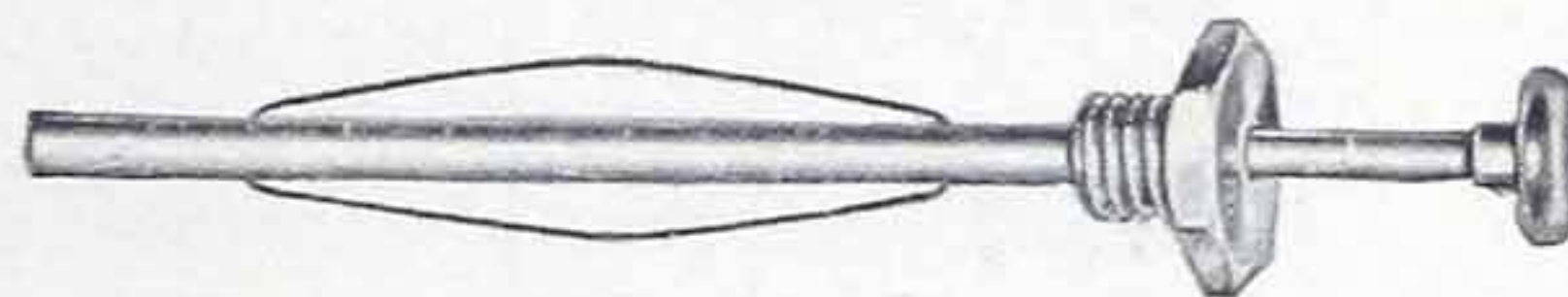
WRICO PEN PARTS



No. 3756A



No. 3756B



No. 3756C



No. 3756D

No.	Description	Code Word	No.	Description	Code Word
No. 3756-A.	Points (specify pen size)	WIT	No. 3756-C.	Plungers (fit all sizes)	WITALL
No. 3756-B.	Needles (specify pen size)	WITAD	No. 3756-D.	Ferrules (fit all sizes)	WITANT
			No. 3756-E.	Barrels (fit all sizes)	WITAX

WRICO PEN CLEANER

If ink has been allowed to dry on any Wrico Pen or on any other drafting instrument, the Wrico Pen Cleaner will remove it quickly.

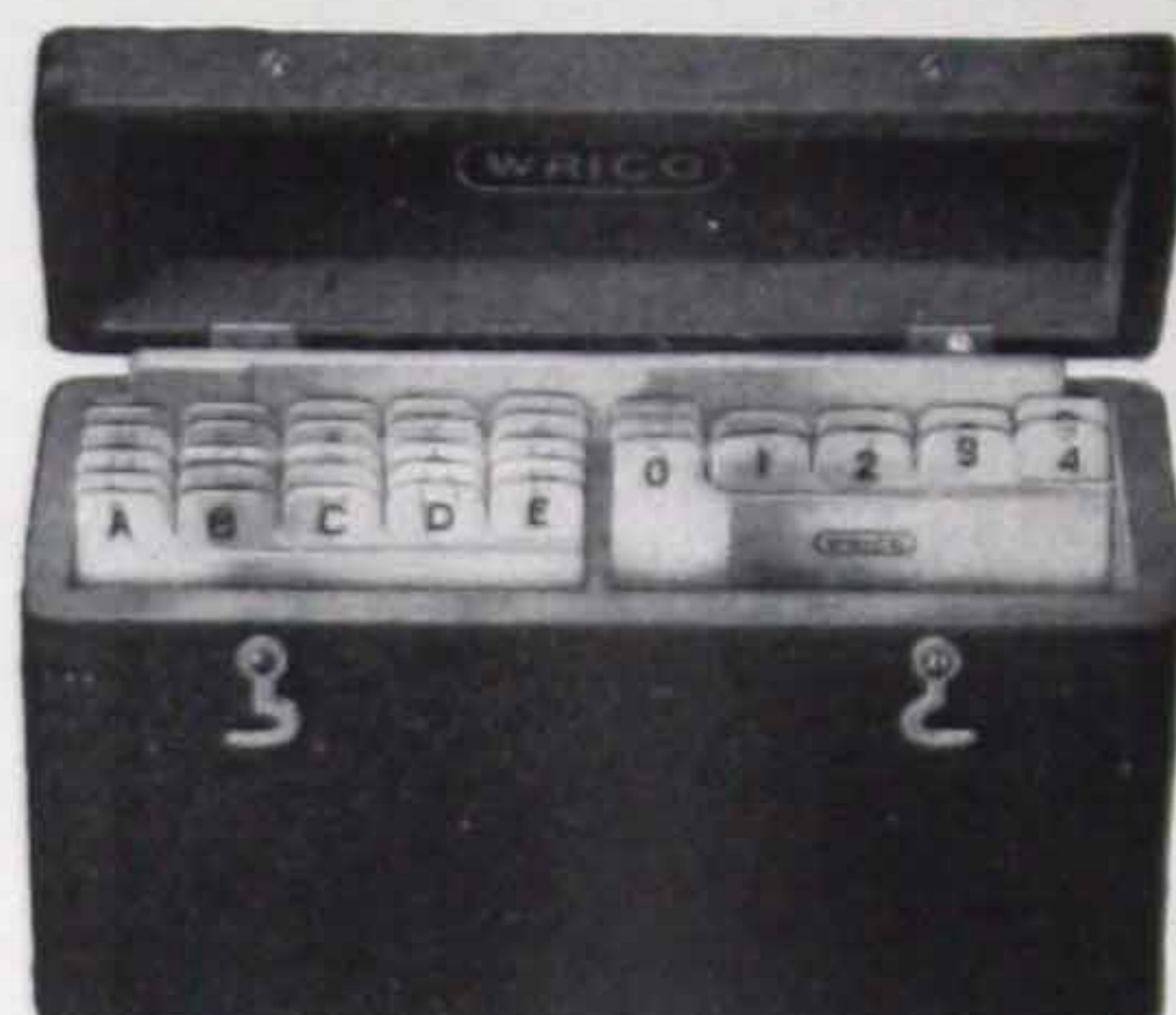
1 Oz. 1 Pint

No. 3757

SEE PRICE LIST IN BACK OF CATALOG

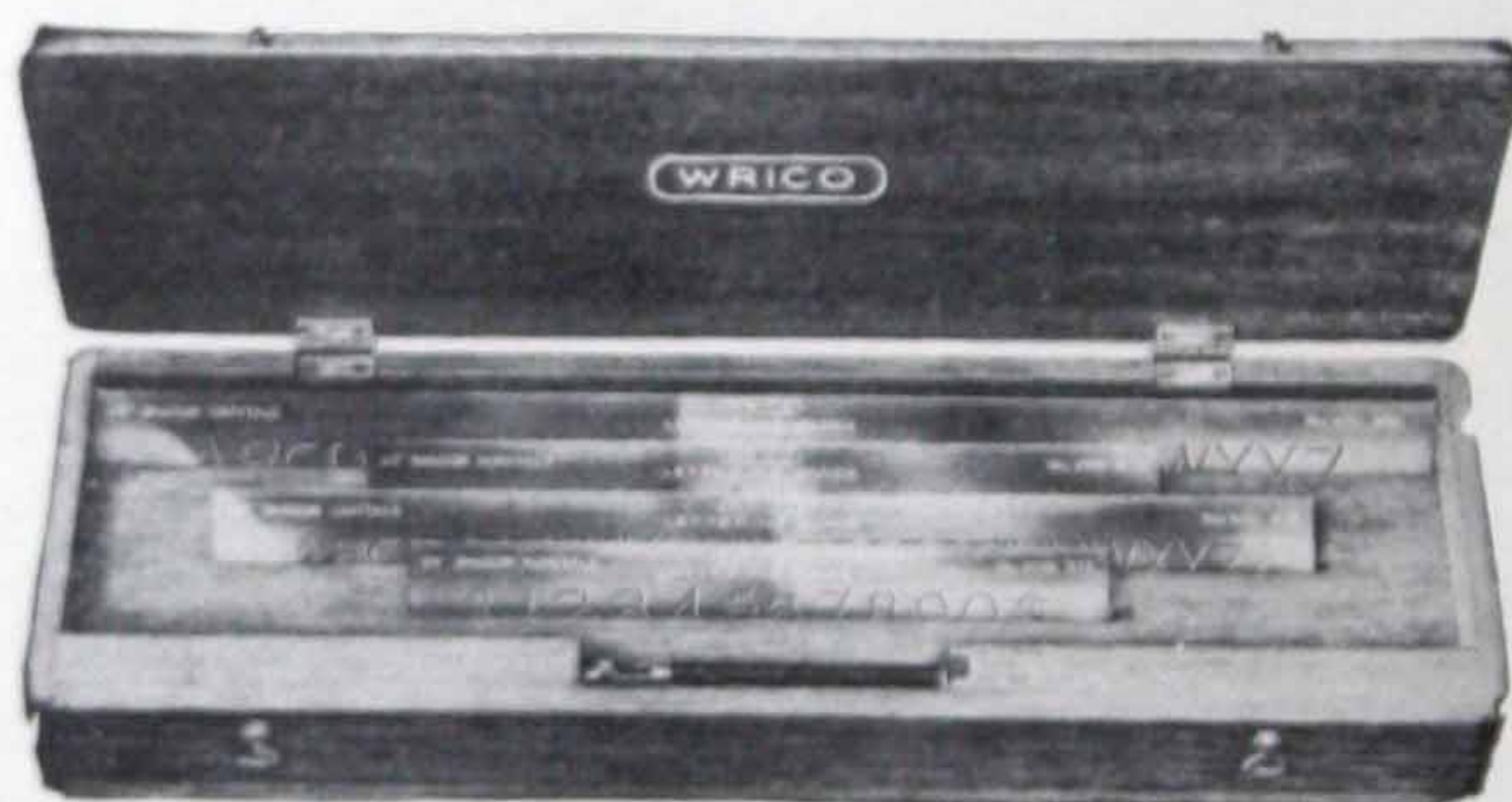
WRICO SETS

OUTLINE LETTERING



Wrico No.	Containing	Code Word
G-100	Twenty-five 1" Wrico Guides for letters A to Z, eleven 1" Wrico Guides for numerals 0 to 9 and one Guide Holder.	WITEC
G-75	Twenty-five 3/4" Wrico Guides for letters A to Z, eleven 1/4" Wrico Guides for numerals 0 to 9 and one Guide Holder.	WITEDE

SHADOW LETTERING



Wrico No.	Containing	Code Word
VH	Guides Nos. VHC 500, VHC 375, VHN 500, VHN 375, and one lettering pen No. 6.	WITEEL
	ADSTYLE	
(Modern)	Guides Nos. FC 500, FC 375, FC 250, FC 185, FN 500, FN 375, FN 250, FN 185, and two lettering pens Nos. 6 and 7.	WITEFT

SEE PRICE LIST IN BACK OF CATALOG

KOH-I-NOOR DRAWING PENCILS



No. 3760

No. 3760. Koh-i-noor Drawing Pencils, hexagon, yellow polish, in the following degrees: 9H, 8H, 7H, 6H, 5H, 4H, 3H, 2H, H, F, HB, B, 2B, 3B, 4B, 5B, 6B.....

Gross

Dozen

METRIC DRAWING PENCILS



No. 3766

No. 3766. Metric Drawing Pencils, hexagon, yellow polish, in the following degrees: 6H, 4H, 3H, 2H, H, F, HB, B, 2B..

Gross

Dozen

EAGLE DRAFTING PENCILS



No. 3768

No. 3768. Eagle Drafting Pencils, round, extra thick black lead..

Gross

Dozen

VENUS DRAWING PENCILS



No. 3770

No. 3770. Venus Drawing Pencils, hexagon, mottled green polished cedar, in the following degrees: 9H, 8H, 7H, 6H, 5H, 4H, 3H, 2H, H, F, HB, B, 2B, 3B, 4B, 5B, 6B....

Gross

Dozen

KIM-BER-LY DRAWING PENCILS



No. 3772

No. 3772. Kim-ber-ly Drawing Pencils, hexagon, green polish, in the following degrees: 9H, 8H, 7H, 6H, 5H, 4H, 3H, 2H, H, F, HB, B, 2B, 3B, 4B, 5B, 6B.....

Gross

Dozen

SEE PRICE LIST IN BACK OF CATALOG

CASTELL DRAWING PENCILS



No. 3776

No. 3776.

Castell Drawing Pencils, hexagon, green polish, in the following degrees: 9H, 8H, 7H, 6H, 5H, 4H, 3H, 2H, H, F, HB, B, 2B, 3B, 4B, 5B, 6B.....

Gross

Dozen

CASTELL REFILL DRAWING PENCILS

With new knurled tip and improved internal construction.



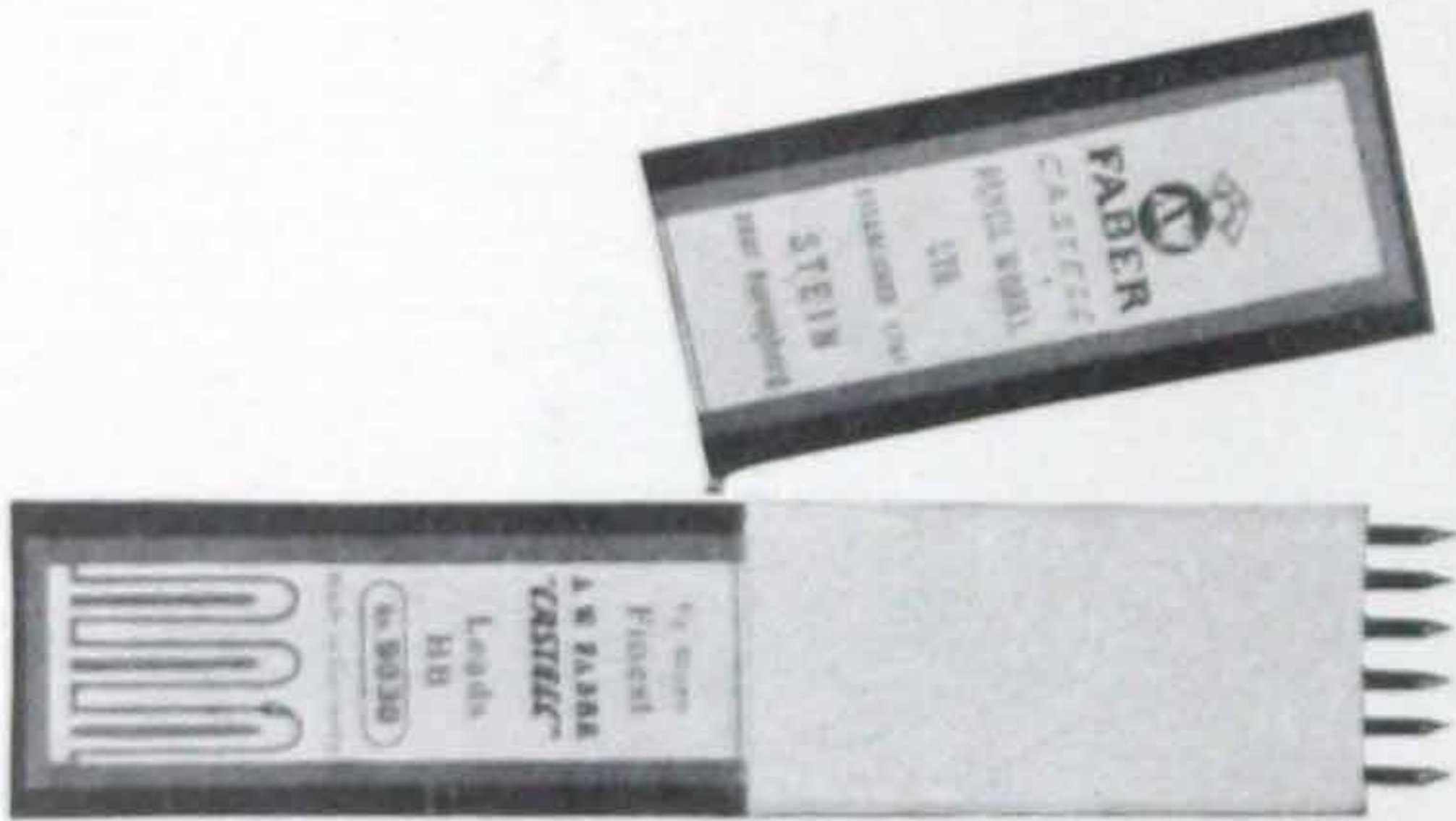
No. 3777

No. 3777.

Castell Refill Drawing Pencil, 6½ inches long, with movable leads, hexagon, green polish, bone tip. A holder for each of the following degrees of lead: 8H, 7H, 6H, 5H, 4H, 3H, 2H, H, F, HB, B, 2B, 3B, 4B, 6B.....

Each

CASTELL BLACK DRAWING LEADS



No. 3779

No. 3779.

Castell leads for Refill Pencils No. 3777. Packed 6 leads to a box. 8H, 7H, 6H, 5H, 4H, 3H, 2H, H, F, HB, B, 2B, 3B, 4B, 6B.....

Per box

ELDORADO DRAWING PENCILS



No. 3780

No. 3780.

Eldorado Drawing Pencils, hexagon, yellow polish, in the following degrees: 8H, 7H, 6H, 5H, 4H, 3H, 2H, H, F, HB, B, 2B, 3B, 4B.....

Gross

Dozen

SEE PRICE LIST IN BACK OF CATALOG

TICONDEROGA PENCILS

With red rubber tips.



No. 3788

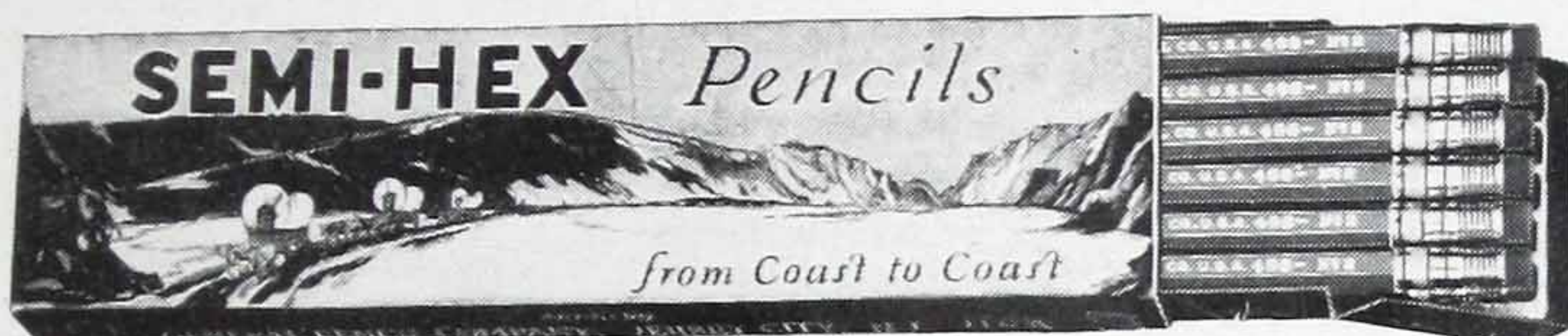
Gross

Doz.

No. 3788. Ticonderoga Pencils, hexagon, cornerless, yellow finish, gilt ferrule with red rubber tip, in the following grades: 1, 2, 2½, 3, 4.....

SEMI-HEX PENCILS

With red rubber tips.



No. 3790

Gross

Doz.

No. 3790. Semi-Hex Pencils, hexagon shape but rounded corners, lustrous yellow finish, gilt ferrule with red rubber tip, in the following grades: 1, 2, 2¼, 3, 4.

METROPOLITAN DETAIL DRAWING PENCILS



No. 3797

Gross

Doz.

No. 3797. Metropolitan Detail Drawing Pencils, hexagon, in the following grades: 1 or B, 2 or HB, 3 or H, 4 or 3H.....

The Metropolitan Detail Pencils are uniformly graded, free from grit, and are an excellent pencil for sketching and drawing details.

MEPHISTO COPYING PENCILS



The best known and most popular copying pencil made.

UNTIPPED

Gross

Doz.

No. 73B Medium—Mephisto Copying Pencils, round, violet ink lead.....

No. 73B Hard—Mephisto Copying Pencils, round, violet ink lead.....

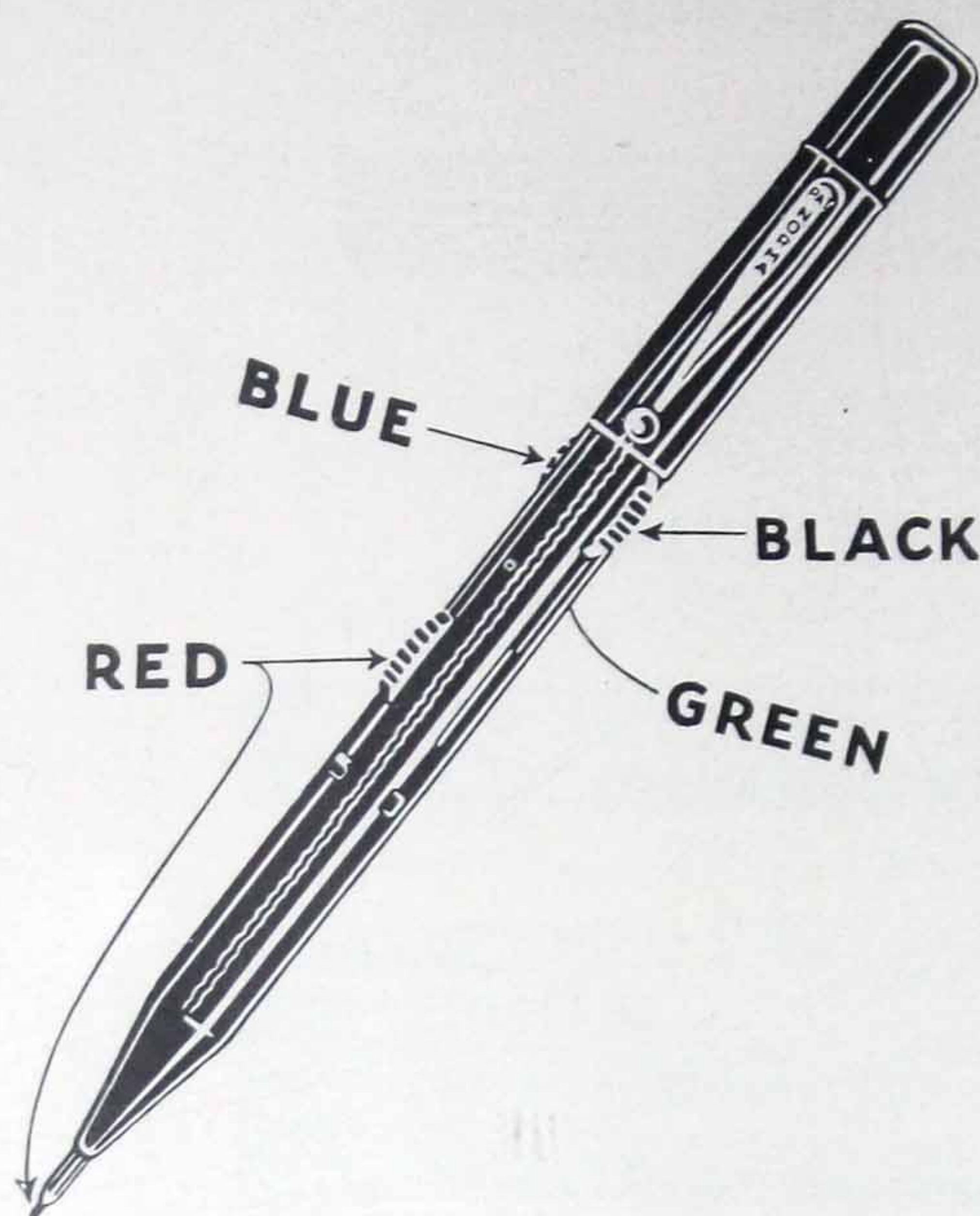
No. 73B Extra Hard—Mephisto Copying Pencils, round, violet ink lead.....

TIPPED, WITH MOUTHPIECE

No. 77 Medium—Mephisto Copying Pencils, round, violet ink lead.....

No. 77 Hard—Mephisto Copying Pencils, round, violet ink lead.....

SEE PRICE LIST IN BACK OF CATALOG



4

NORMA

COLOR PENCILS

A high grade mechanical pencil with four different colors of lead, black, blue, red and green. Colors instantly shifted by merely a flick of the finger. Uses standard .046 leads.

- No. 3801. Norma Four-Color Pencil nickel-silver, chased metal throughout.....Code Word, **WIUDE**
- No. 3801G. Norma Four-Color Pencil rolled gold plate, hand chased.Code Word, **WIUCK**

LISTO MECHANICAL PENCILS

These pencils propel, expel and repel.



- | | | |
|----------|---|---------------------------|
| No. 465. | Listo adjustable pencil with controller feature affording easy access to action parts, with clip, concealed eraser and .046 black or colored leads (specify color desired). | Code Word
WIUFT |
| No. 41. | Listo adjustable pencil without controller, with exposed eraser tip and clip and .046 black or colored leads (specify color desired)..... | WIUFER |

LEADS FOR MECHANICAL PENCILS

- | | | |
|-----------|--|---------------------------------|
| No. 1246. | Black Leads .046 size in the following degrees: 2B, B, HB, F, H, 2H, 3H..... | Per tube of 18
WIUGE |
| No. 1246. | Colored leads .046 size in the following colors: red, blue, green, yellow, purple, orange, brown, indelible. . . | WIUKLE
Per tube of 10 |
| No. 1076. | Black Leads .076 size in the following degrees: 5B, 2B, HB, 3H..... | WIULT
Per tube of 12 |
| No. 1076. | Colored Leads .076 size in the following colors: red, blue, green, yellow, carbon, brown, orange, purple, white..... | WIUME |

SEE PRICE LIST IN BACK OF CATALOG

LISTO MECHANICAL PENCILS with center turn

Listo Pencils are the original unbreakable pencils.

Made of Listolite, neither wood, metal or rubber but an unbreakable composition used extensively in the manufacture of high priced pens. It is feather-light, flexible and pleasant to the touch. Extraordinarily durable. Colors are permanent and untarnishable. The pencil is easily and quickly leaded.

- | | | |
|---------|---|-----------|
| | | Code Word |
| No. 5. | Listo center turn pencil with clip and .076 black or colored leads (specify color desired)..... | WIUND |
| No. 10. | Listo center turn pencil with clip and .046 black or colored leads (specify color desired)..... | WIUPE |

LISTO CHINA MARKER AND CRAYON PENCILS

- | | | |
|-----------|---|--------|
| No. 1620. | Listo china marker pencil. Marks on cellophane, tin, crockery or glass. Top turn with clip and .162 black, red or blue leads (specify color desired)..... | WIURCK |
| No. 1623. | Listo Crayon pencil, top turn, with clip and .162 black, red or blue leads (specify color desired)..... | WIURED |

LEADS FOR CHINA MARKER AND CRAYON PENCILS

- | | | |
|-----------|---|---------------|
| | | Per tube of 6 |
| No. 162. | China Marker leads .162 size, black, red or blue..... | WIUST |
| No. 3162. | Crayon leads .162 size, black, red or blue..... | WIUTE |

Extra leads for No. 5 and No. 10 Listo pencils listed on page 392.



No. 5



No. 1620

SEE PRICE LIST IN BACK OF CATALOG

PENCIL POINT PROTECTORS AND PENCIL LENGTHENERS



No. 3810

Dozen Each

No. 3810. Aluminum one-piece Pencil Lengthener.....

One-piece Pencil Lengthener No. 3810 is most efficient. Made of one piece, eliminating all chances of any part becoming loose or wobbly. The Pencil stubs may be screwed in at either end, or one end will accommodate an eraser. The threads will grip the pencil tightly and pencil and lengthener will be as firm as one piece.



No. 3815

Per doz. Each

No. 3815. Pencil Lengthener, hexagon, yellow, polished handle, long nickeled ferrule with screw end.....



No. 3817

Per doz. Each

No. 3817. All Metal Pencil Lengthener, nickel plated, 4 1/8 inches long, with slide and red rubber.....



No. 3820

Per doz. Each

No. 3820. Pencil Point Protector, round with eraser.....

RUBBER PENCIL TIPS



No. 3828

Gross Per doz.

No. 3828. Hexagon Rubber Pencil Tips, red rubber.....

SEE PRICE LIST IN BACK OF CATALOG



No. 3830

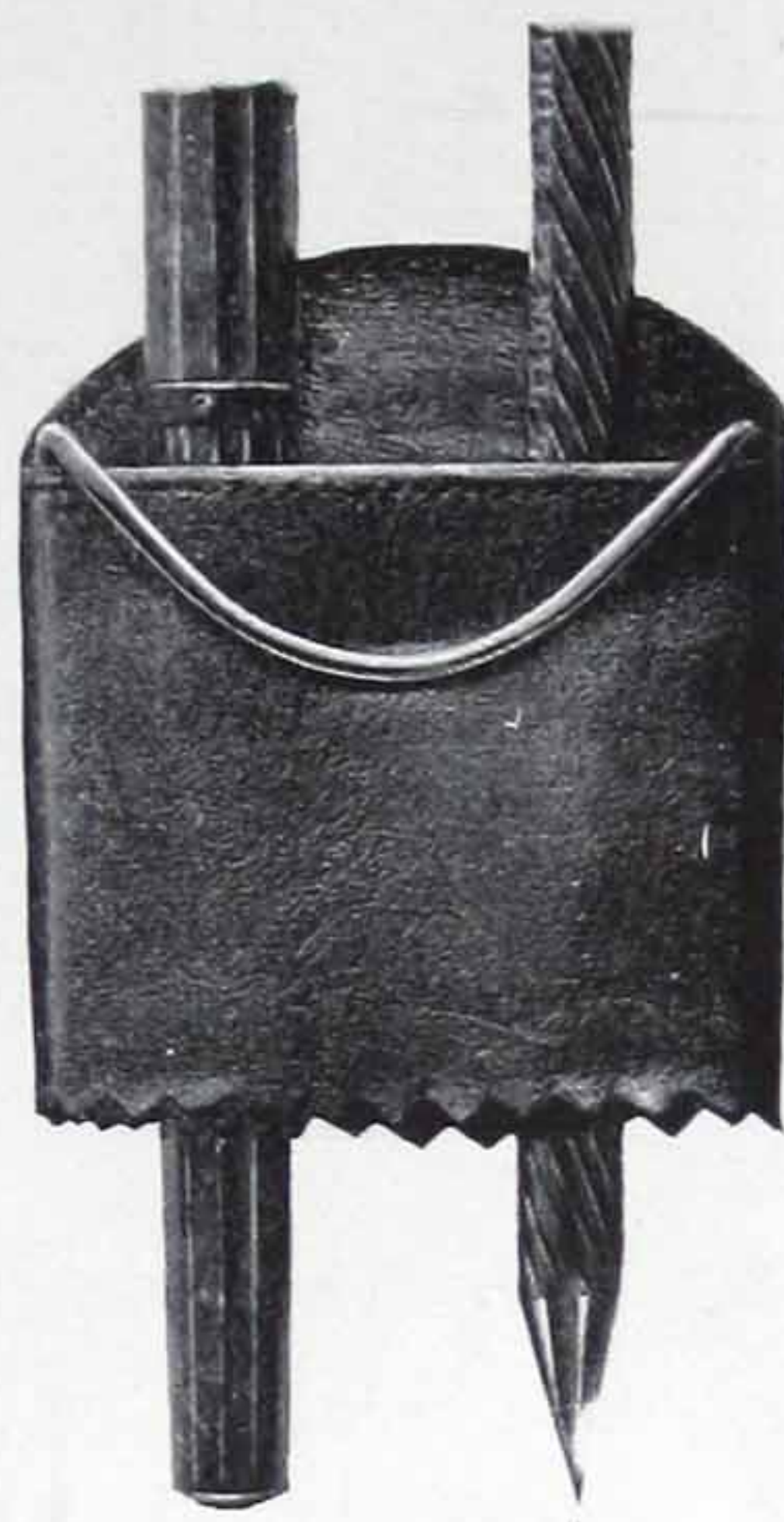
PENCIL CLIPS

- No. 3830. Metal Pencil Clip, made of heavy brass, nickel plated, for all standard Pencils. . . . Code Word **WOACK**

PENCIL POCKETS

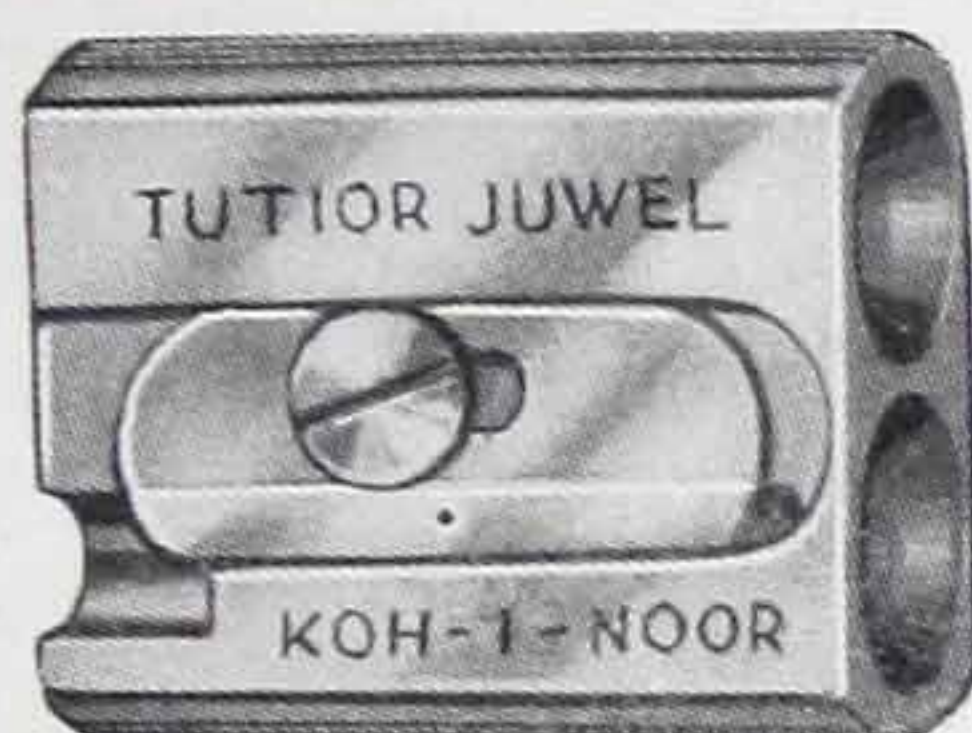
Worn inside the pocket, with metal spring to attach. Also suitable for holding pocket scales.

- No. 3833. Imitation Leather Pencil Pocket. . . . Code Word, **WOADE**



No. 3833

TUTOR JUWEL PENCIL SHARPENER



This sharpener has two blades, one cuts away the wood only and the other points the lead. Especially designed for the draftsman to correctly point pencils without waste of time or pencil. Made of heavy brass, the two steel blades are adjustable and renewable. Contained in leather pouch with snap fastener.

- No. 3840. Tutor Jewel Pencil Sharpener in leather pouch. . . . Code Word **WOAF**
No. 3840C. Extra set of blades. Per set **WOAGY**

MAGNO TACK LIFTER AND PENCIL FILE



The Magno Tack Lifter and Pencil File has a magnetized point. When you lift a thumbtack it will adhere to the tack-lifter and not roll on the floor. Made of high-grade tool steel; pencil file on both sides.

- No. 3843. Magno Tack Lifter and Pencil File, hole in handle for hanging on drafting board. Code Word **WOAKE**

PENCIL POINTERS

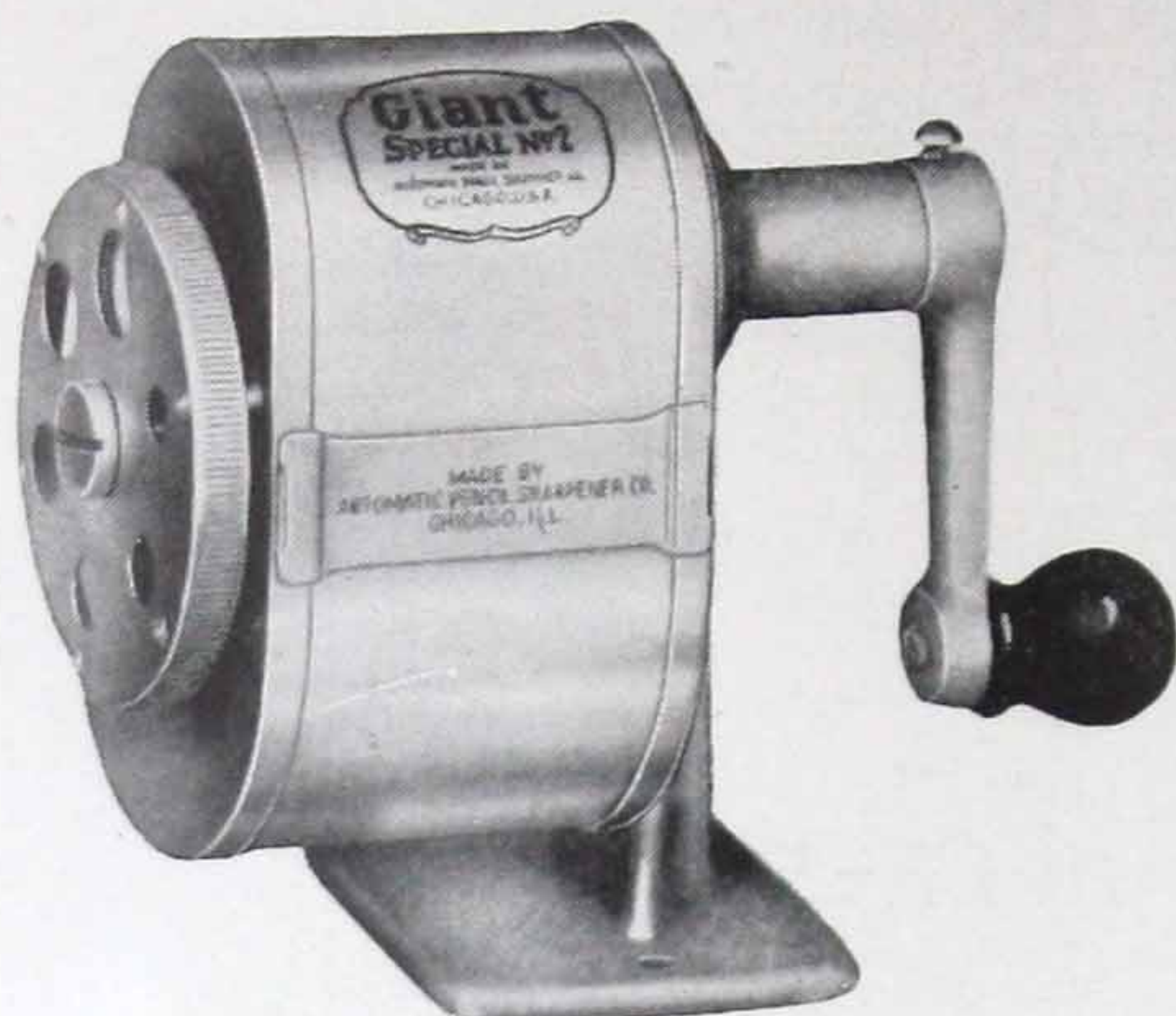


No. 3845

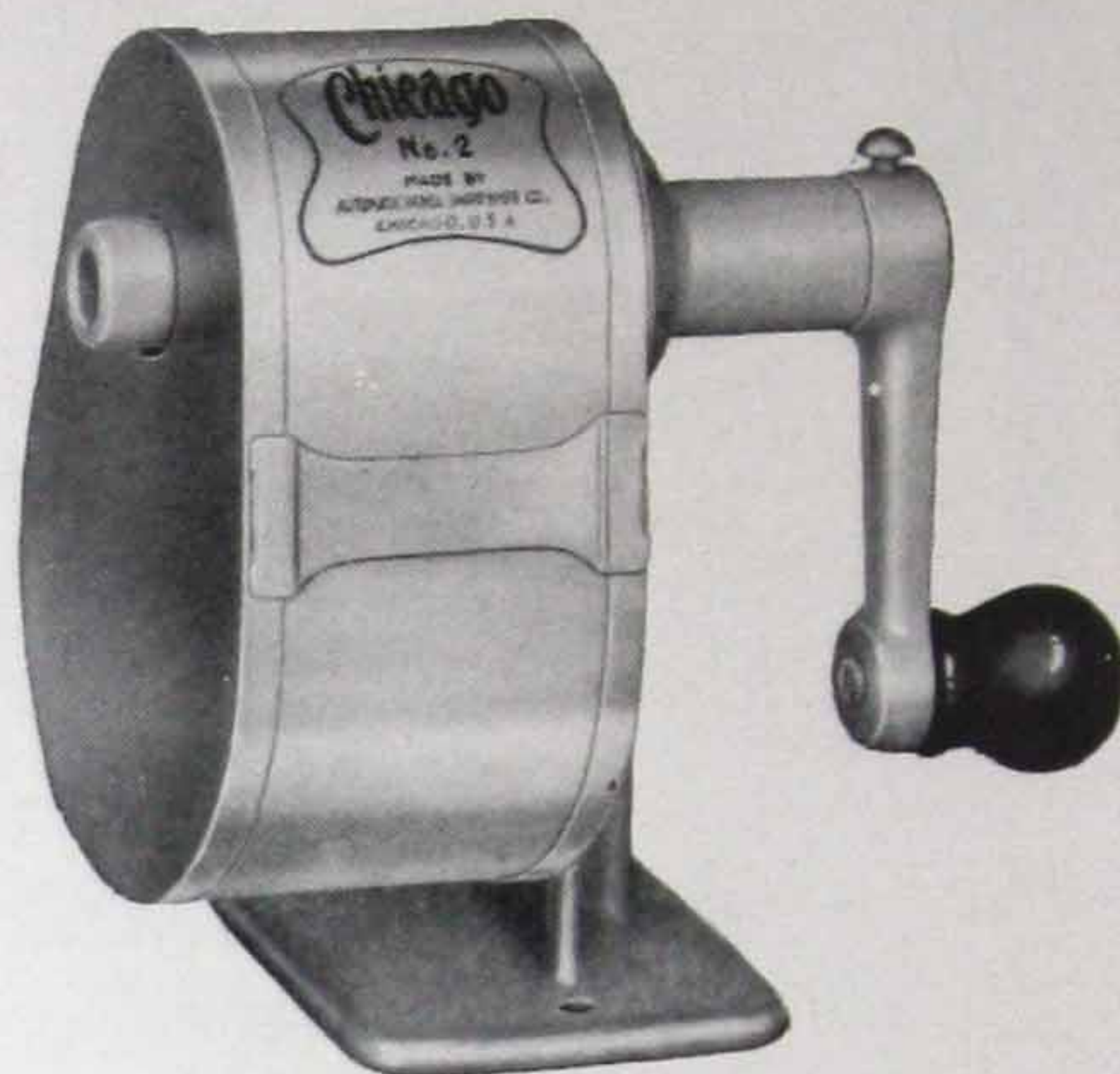
- No. 3845. Sandpaper Pencil Pointer, 1 1/4 x 4 inches, with handle. . . . Code Word **WOALT**
No. 3846. Emery Paper Pencil Pointer, 1 1/4 x 4 inches, with handle. **WOANG**

SEE PRICE LIST IN BACK OF CATALOG

PENCIL SHARPENERS



No. 3847



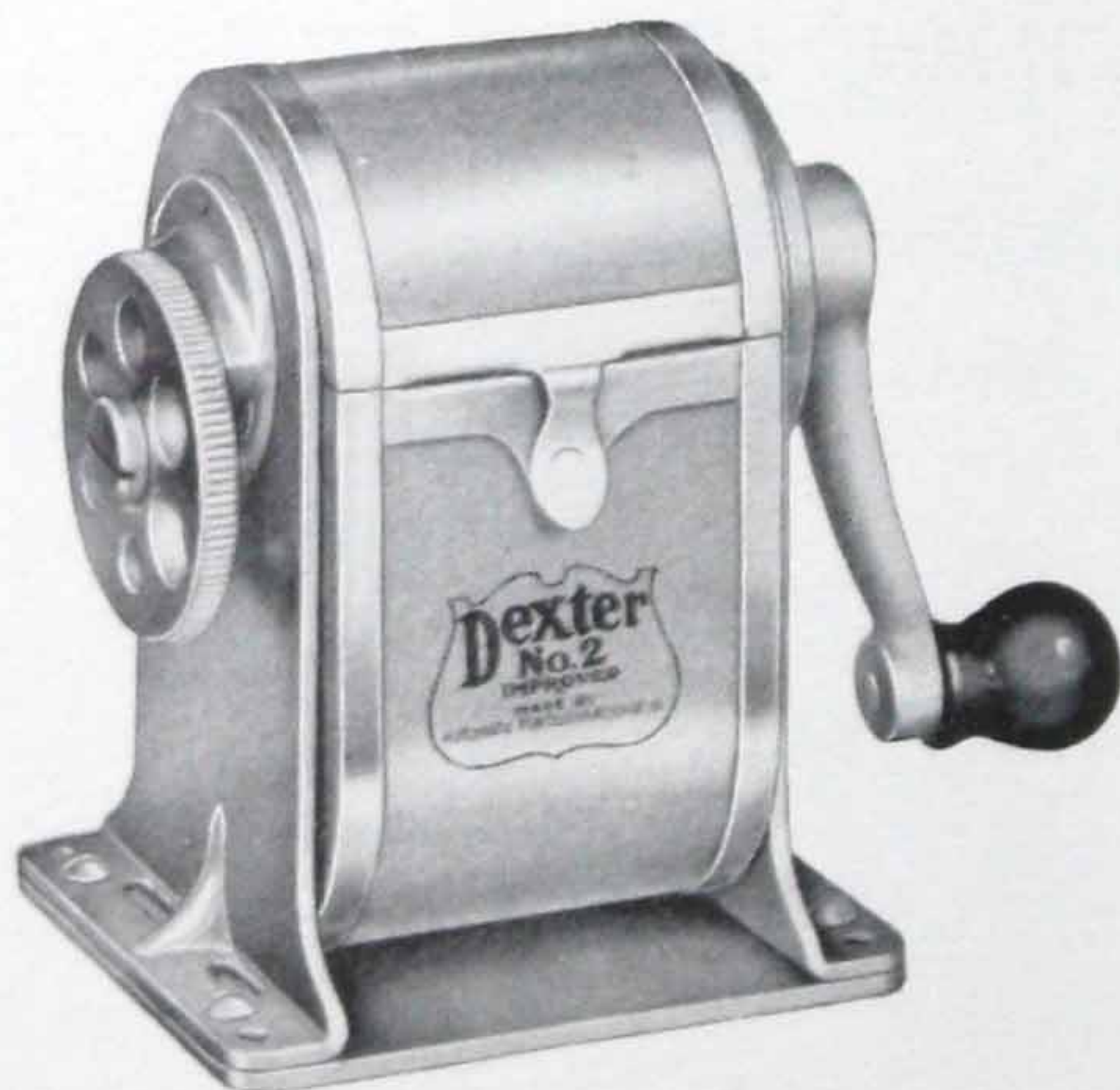
No. 3848

No. 3847. The Chicago Giant Pencil Sharpener. . . . Code Word, **WORKMAN**

The Chicago Giant Pencil Sharpener sharpens every pencil and crayon, from the smallest to the largest. Automatically stops cutting when the point is produced. Will not break the leads.

No. 3848. Chicago Pencil Sharpener. Code Word, **WORKHOUSE**

The Chicago Pencil Sharpener is similar to the Giant No. 3847, but sharpens standard size pencils only.



No. 3849

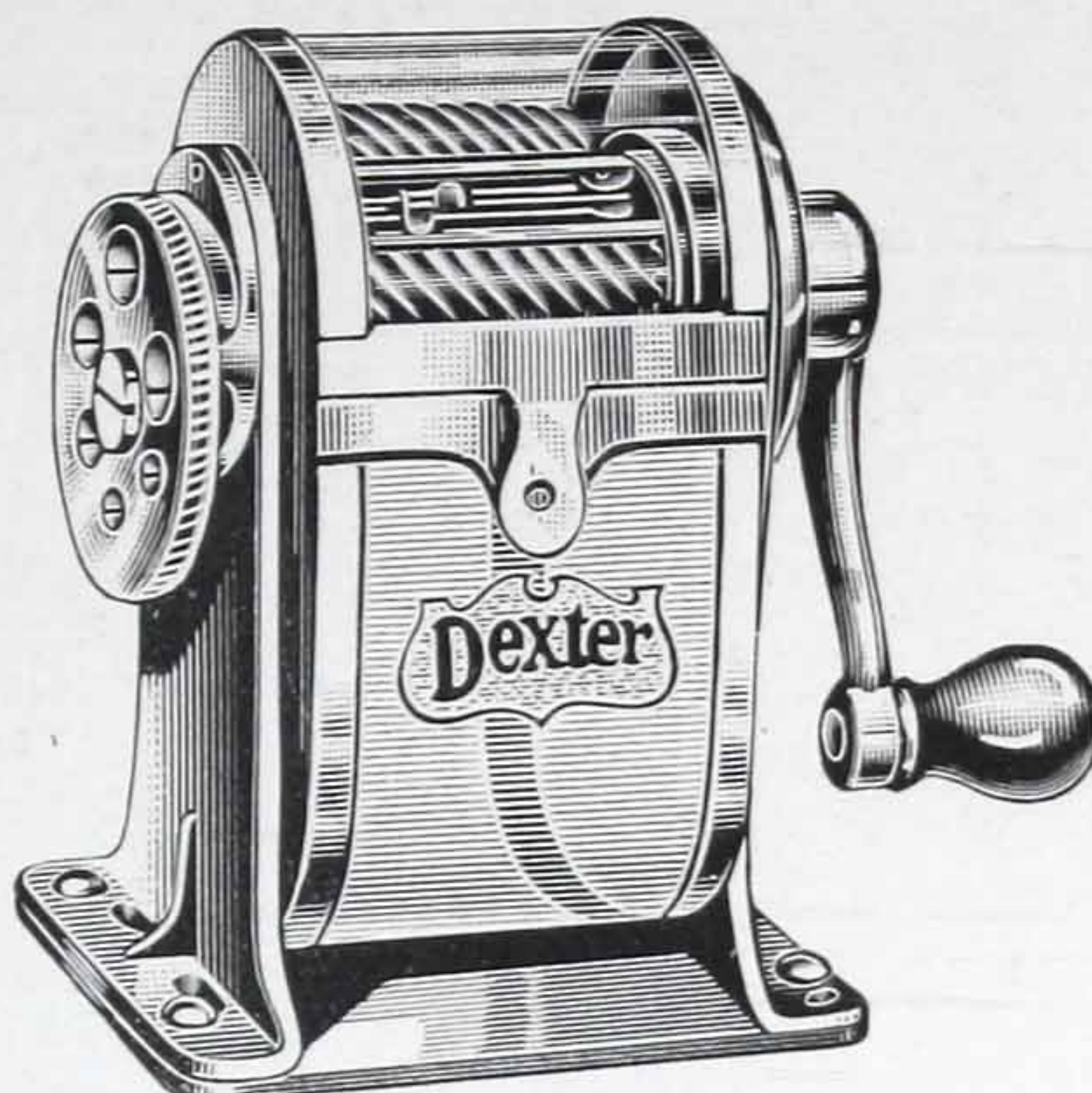
No. 3849. Dexter Pencil Sharpener, automatic feed, stops cutting when point is made; extra fine workmanship and finish. . . . Code Word, **WORMWOOD**

SEE PRICE LIST IN BACK OF CATALOG

DEXTER PENCIL SHARPENER WITH SPECIAL DRAFTSMEN'S CUTTERS



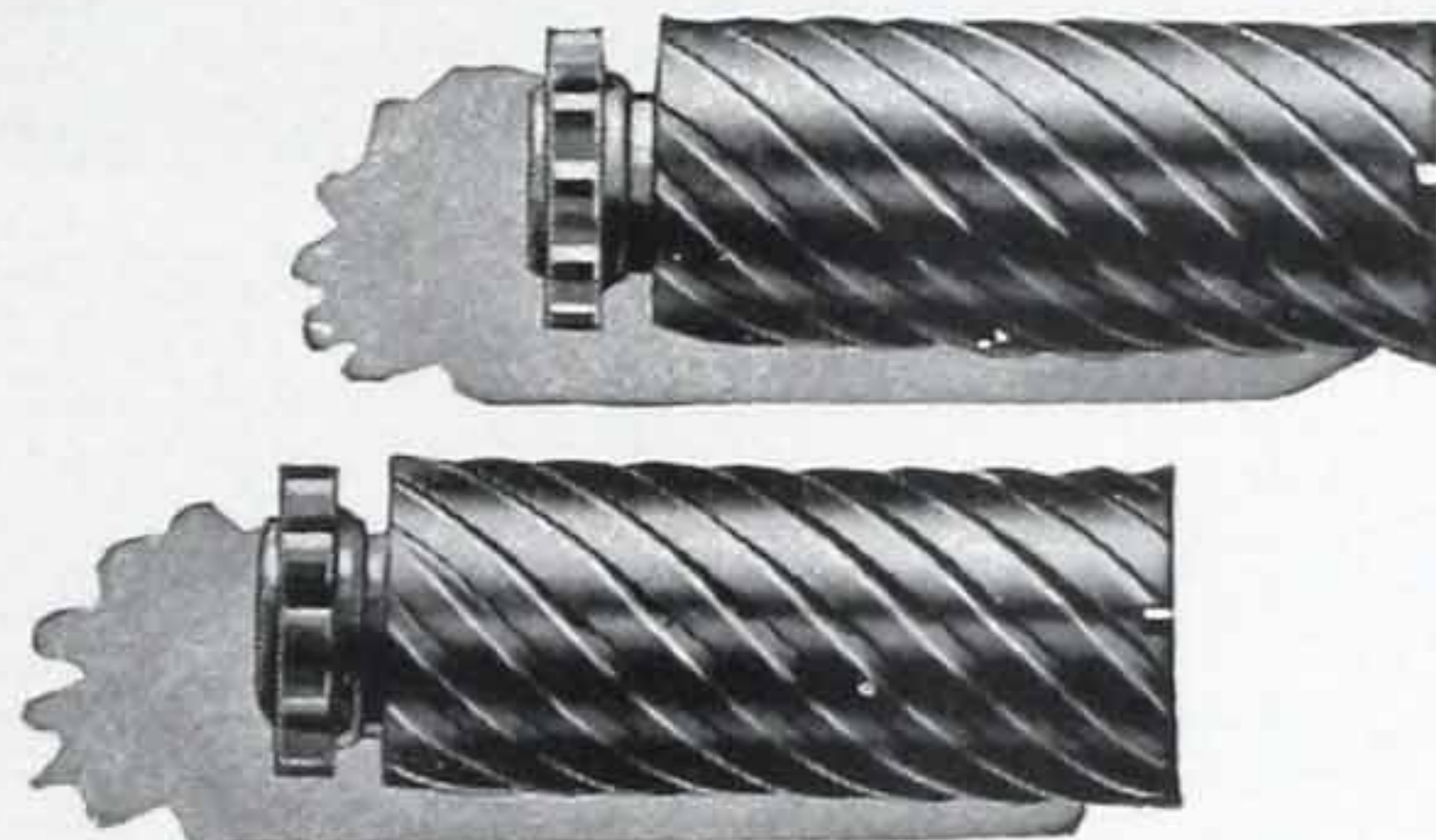
No. 3849DC



No. 3849DC. Same as No. 3849, but with special draftsmen's cutters....

The draftsmen's cutters are specially ground to cut away the wood only, as shown in illustration, leaving the lead exposed, which may be pointed on file or sandpaper to suit the requirements of the user.

EXTRA CUTTERS AND CLAMPS



Replacing Dull Cutters

All Pencil Sharpeners will produce thousands of points before the cutters become dull. However, no steel edge can indefinitely withstand cutting through lacquer, enamel, wood, glue and graphite, all of which form a lead pencil. In time the edge becomes dull and to obtain the best service from your pencil sharpener, the cutters should be replaced. New cutters are easily inserted and are nominal in cost.

No. 3847C. Extra Cutters for No. 3847 Giant Pencil Sharpener.

.....Code Word, **WRAPPER**

No. 3848C. Extra Cutters for No. 3848 Chicago Pencil Sharpener.

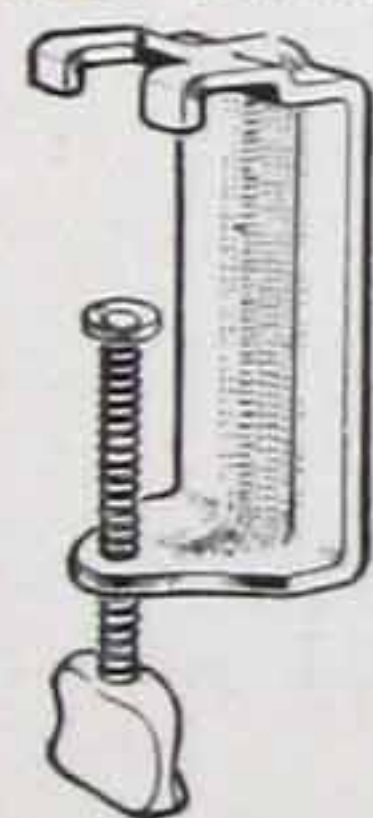
.....Code Word, **WRASSE**

No. 3849C. Extra Cutters for No. 3849 Dexter Pencil Sharpener.

.....Code Word, **WREATH**

No. 3849DCC. Extra Cutters for No. 3849DC Pencil Sharpener.

.....Code Word, **WRECKER**



CLAMPS FOR FASTENING PENCIL SHARPENERS

No. 3847F. Clamp for fastening Pencil Sharpeners to Table.

.....Code Word, **WRESTER**

SEE PRICE LIST IN BACK OF CATALOG

DIXON'S BEST COLORED PENCILS



No. 3852

Dixon's Best Colored Pencils are made in the following colors:

320 Sky Blue	335 Sepia
320½ Azure	335½ Burnt Ochre
321 Carmine	343 Brown*
321½ Lake Red*	349 Red*
322 Pink	350 Blue*
323 Violet*	351 Terra Cotta
323½ Purple	352 White*
324 Orange*	352½ Gray*
324½ Yellow Ochre*	353 Golden Yellow*
325 Olive Green	353½ Lemon Yellow
330 Ultramarine	354 Green*
331 Black*	354½ Light Green

No. 3852-12

No. 3852. Dixon's Best Colored Pencils, listed above..... Per doz. Each

ASSORTED BOXES

No. 3852-12*. Box containing assortment of 12 Dixon's Colored Pencils...

No. 3852-24. Box containing assortment of 24 Dixon's Colored Pencils...

CHINA, GLASS AND METAL MARKERS



No. 3858

These Pencils are especially made for marking on glass, metal or materials with a glossy surface. Round, paper wrapped. In the following colors:

71 Red	80 Blue	74 Green	77 Black	73 Yellow
			Per Gross	Doz. Each

No. 3858. China Marking Pencils, listed above.....

Also see Listo Mechanical China Marker pencils on page 393.

GOLD AND SILVER PENCILS



No. 3859G.	Kim-ber-ly thin lead Gold Pencils.....	Per Doz.	Each
No. 3859S.	Kim-ber-ly thin lead Silver Pencils.....		

SEE PRICE LIST IN BACK OF CATALOG

THIN-EX COLORED PENCILS



No. 3860

Finest quality with new process thin brilliant color leads. Hexagon shape, they retain a fine point and make a thin line or mark. Made in the following colors:

369 Lake Red*	375 Green*	383 Scarlet	393 Azure
370 Red*	376 Blue*	388 Gold Ochre	394 Light Blue
371 Vermilion*	377 Violet*	389 Apple Green	396 Purple
372 Orange*	378 Brown*	390 White*	397 Terra Cotta
373 Yellow*	379 Black*	391 Olive Green	398 Burnt Sienna
374 Lemon Yellow*	381 Pink	392 Light Green	399 Gray
			Gro. Doz. Each

No. 3860. Thin-Ex Hexagon Colored Pencils, listed above.

ASSORTED BOXES

No. 3680-12*. Box containing assortment of 12 Thin-Ex Colored Pencils.

No. 3860-24. Box containing assortment of 24 Thin-Ex Colored Pencils.

MONGOL THIN LEAD COLORED INDELIBLE PENCILS



Purple*	Lemon Yellow	Grey	French Green
Black*	Light Blue*	Prussian Blue	White
Dark Blue*	Orange*	Pink	Brown Ochre
Carmine*	Red*	Brown*	Light Green*
Burnt Carmine	Prussian Green	Yellow*	Heliotrope*
Terra Cotta	Olive Green	Vandyke Brown	Dark Green*
			Gro. Doz. Each

No. 3865. Mongol Thin Lead Colored Indelible Pencils as listed above.

ASSORTED BOXES

No. 3865-12* Box containing assortment of 12 Mongol Colored Pencils..

No. 3865-24. Box containing assortment of 24 Mongol Colored Pencils..

KIM-BER-LY THIN LEAD COLORED INDELIBLE PENCILS



No. 3866-12

400



No. 3866

Rounded hexagon shape, exceptionally strong brilliant indelible leads. Recommended for checking, writing or water color painting. Made in the following colors:

703 Blue*	709 White	715 Black*
704 Brown*	710 Pink*	716 Heliotrope*
705 Red*	711 Lemon Yellow	717 Ochre Yellow
706 Purple*	712 Light Blue*	718 Carmine
707 Dk. Green*	713 Yellow*	719 Terra Cotta
708 Orange*	714 Light Green*	
		Gro. Doz. Each

No. 3866. Kim-ber-ly Thin Lead Colored Indelible Pencils as listed above.

No. 3866-12*. Box containing assortment of 12 Kim-ber-ly Colored Pencils..

SEE PRICE LIST IN BACK OF CATALOG

FABER'S LUMBER CRAYONS



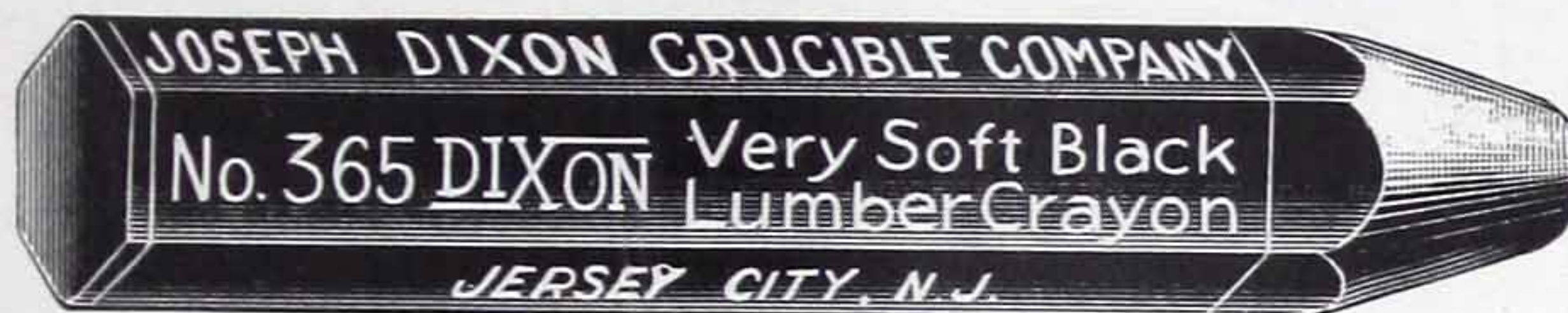
No. 3870

Hexagon shape, paper covered. Made in the following colors:

825 Hard Blue	836 Soft Red	837 Soft Yellow	840 Graphite Soft
835 Soft Blue	833 Terra Cotta	838 Soft Green	850 Graphite Hard
826 Hard Red	834 Soft Purple	830 Soft Black	831 Soft White
			Gross Dozen

No. 3870. Eberhard Faber's Lumber Crayons, listed above.....

DIXON'S LUMBER CRAYONS



No. 3871

Dixon Lumber Crayons are recognized as the best on the market. Used for marking steel and iron, concrete and stone, and lumber in all stages of preparation, from the raw logs up. Hexagon shape, paper covered. Made in the following colors:

494 Carbon Black	520 Red	521 Blue	522 Green
496 Yellow	520½ Soft Red	521½ Soft Blue	523 White
			Gross Dozen

No. 3871. Dixon's Lumber Crayons, listed above.....

DIXON'S BLACK GRAPHITE CRAYONS

No. 3872. Soft Black Graphite Lumber Crayons, Dixon 365, Gross Dozen
paper covered.....

No. 3872S. Soft Black Graphite Lumber Crayons, Dixon, 365½,
japanned finish.....

LUMBER CRAYON HOLDER



No. 3873

The Nickel holder prevents crayons from breaking, and will hold crayon firmly to the shortest stub. Dozen Each

No. 3873. Nickel Holder for Lumber Crayons.....

METAL WORKER'S CRAYON



No. 3875

Very convenient for burnishing tracings after erasing, as well as for marking on metal. Dozen Each

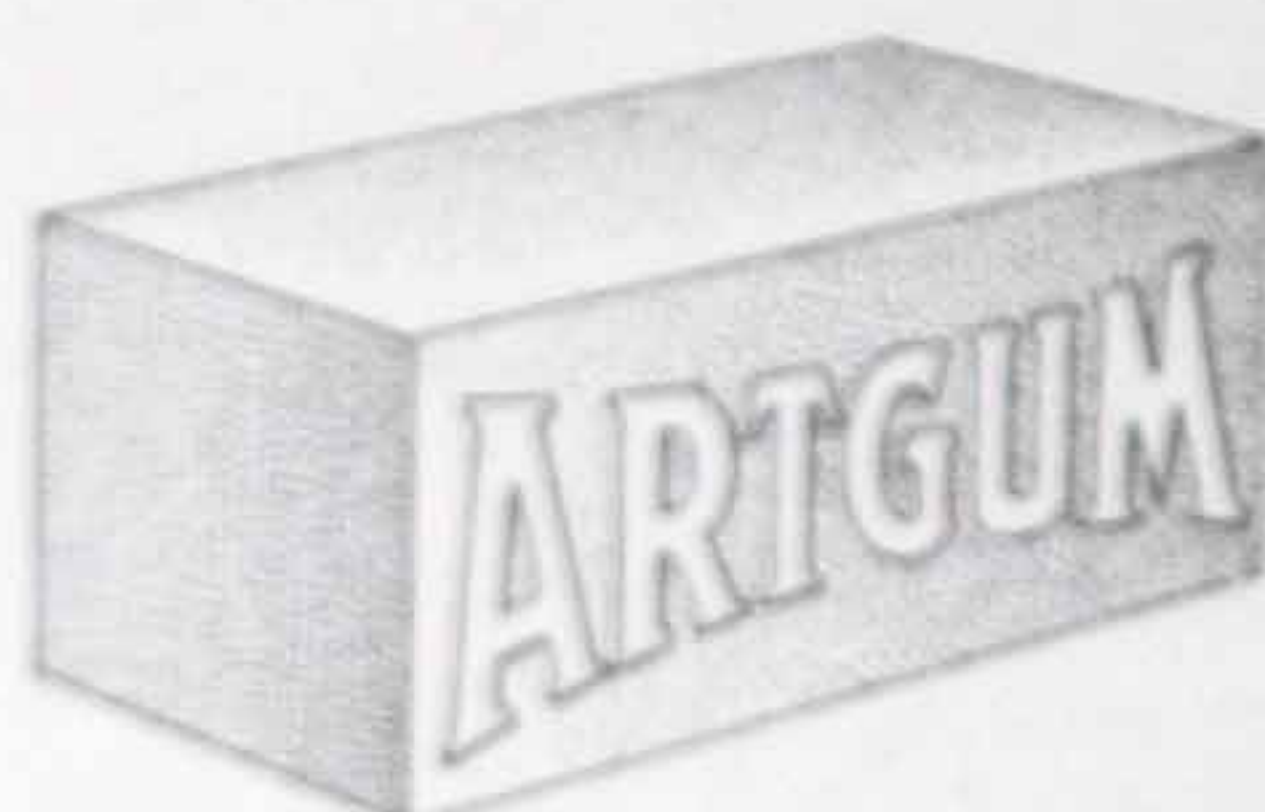
No. 3875. Soapstone, Metal Workers' Crayon, 5 in. long.....

SEE PRICE LIST IN BACK OF CATALOG

CLEANING ERASERS

No. 3881. Claro Eraser and Cleaner,
soft pink.....

Gross Dozen



ARTGUM

Gross Dozen

No. 3883A. Artgum, $1\frac{1}{8} \times 1\frac{1}{8} \times 1\frac{1}{8}$ in.
No. 3883B. Artgum, 2 x1 x1 "
No. 3883C. Artgum, $2\frac{1}{4} \times 1\frac{1}{8} \times 1\frac{1}{8}$ "
No. 3883D. Artgum, 3 x2 x1 "
No. 3883E. Artgum, 3 x3 x2 "

PLASTIC ERASERS

For charcoal drawings or sketch work.
Kneadable, it absorbs the marks and leaves
no crumbs.

No. 3884A. Dough Eraser No. 666
small.....
No. 3884B. Dough Eraser No. 667
large.....

Gross Dozen



PLIABLE ERASERS



Will erase on delicate materials without
injury.

No. 3885. Gray Pliable Rubbers.

Pieces to lb.— 60 40 30 20 8 4

Each.....

Per 1-lb. box...

No. 3886. Artex Eraser No.
400 soft white, bias
shape.....

Gross Dozen



No. 3887. Coraline Eraser No.
310, soft pink color,
bias shape.....

Gross Dozen

DRAFTSMEN'S ERASERS



This Rubber is soft and pliable, and will be found to erase pencil marks easily and without injury to either tracing paper or any other delicate drawing material.

- | | Gross | Dozen |
|---|-------|-------|
| No. 3888A. Pink Pearl Eraser No. 100, medium..... | | |
| No. 3888B. Pink Pearl Eraser No. 101, large..... | | |
- Note: No. 100 Medium Pink Pearl Erasers packed 2 dozen in a box.

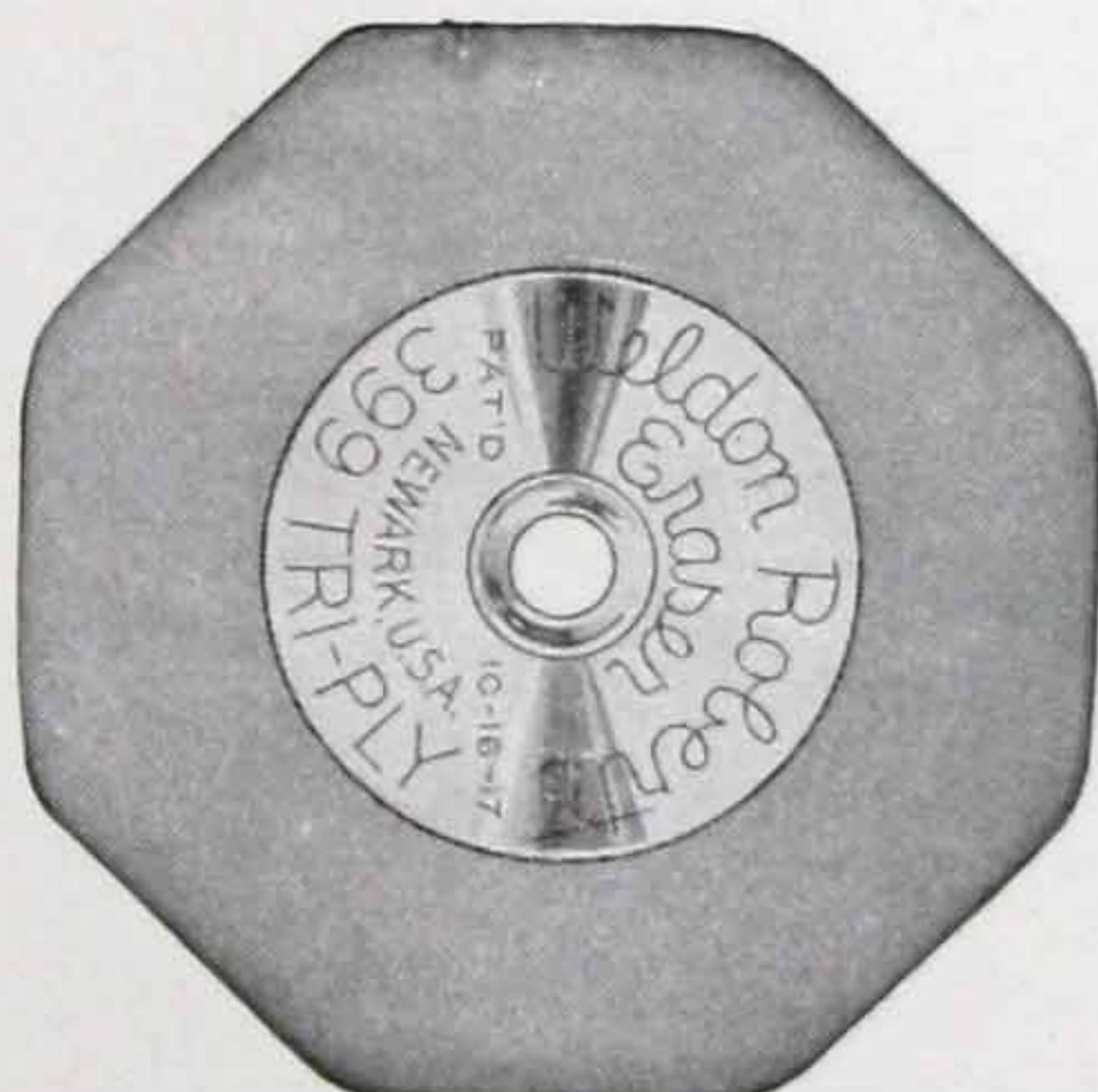


- No. 3889. Hexo-Cleaner No. 1010. A smooth rapid cleaner for paper, fabrics, etc. Pink color, hexagonal shape.
- | Gross | Dozen |
|-------|-------|
|-------|-------|

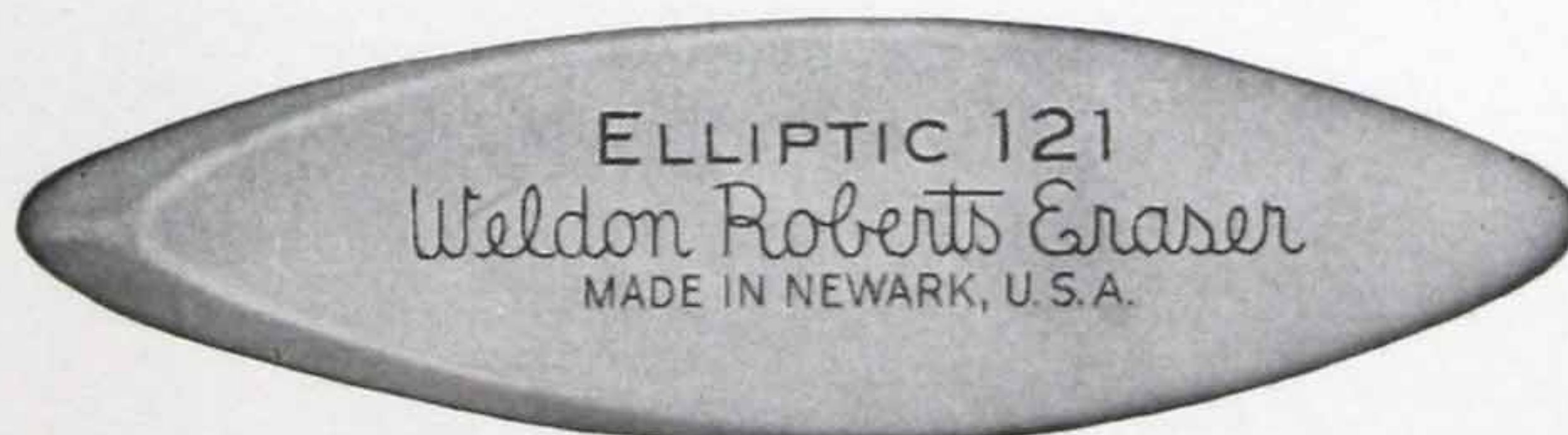
Smooth, Rapid Cleaner
for PAPER, FABRICS etc



- | | Gross | Dozen |
|--|-------|-------|
| No. 3894A. Ruby Eraser No. 112, small, double bevel..... | | |
| No. 3894B. Ruby Eraser No. 212, large, double bevel..... | | |



- No. 3895. Tri-ply Typist Eraser No. 399 made up of three layers with red rubber outside and soft gray ink eraser center.
- | Gross | Dozen |
|-------|-------|
|-------|-------|



- | | Gross | Dozen |
|--|-------|-------|
| No. 3897. Elliptic Eraser No. 121, for ink and pencil..... | | |

SEE PRICE LIST IN BACK OF CATALOG

ERASERS



No. 3898. Duplex Ink and Pencil Eraser No. 575. Gross Dozen



No. 3899. Coral red soft ink eraser No. 230. Special bias bevels. Gross Dozen



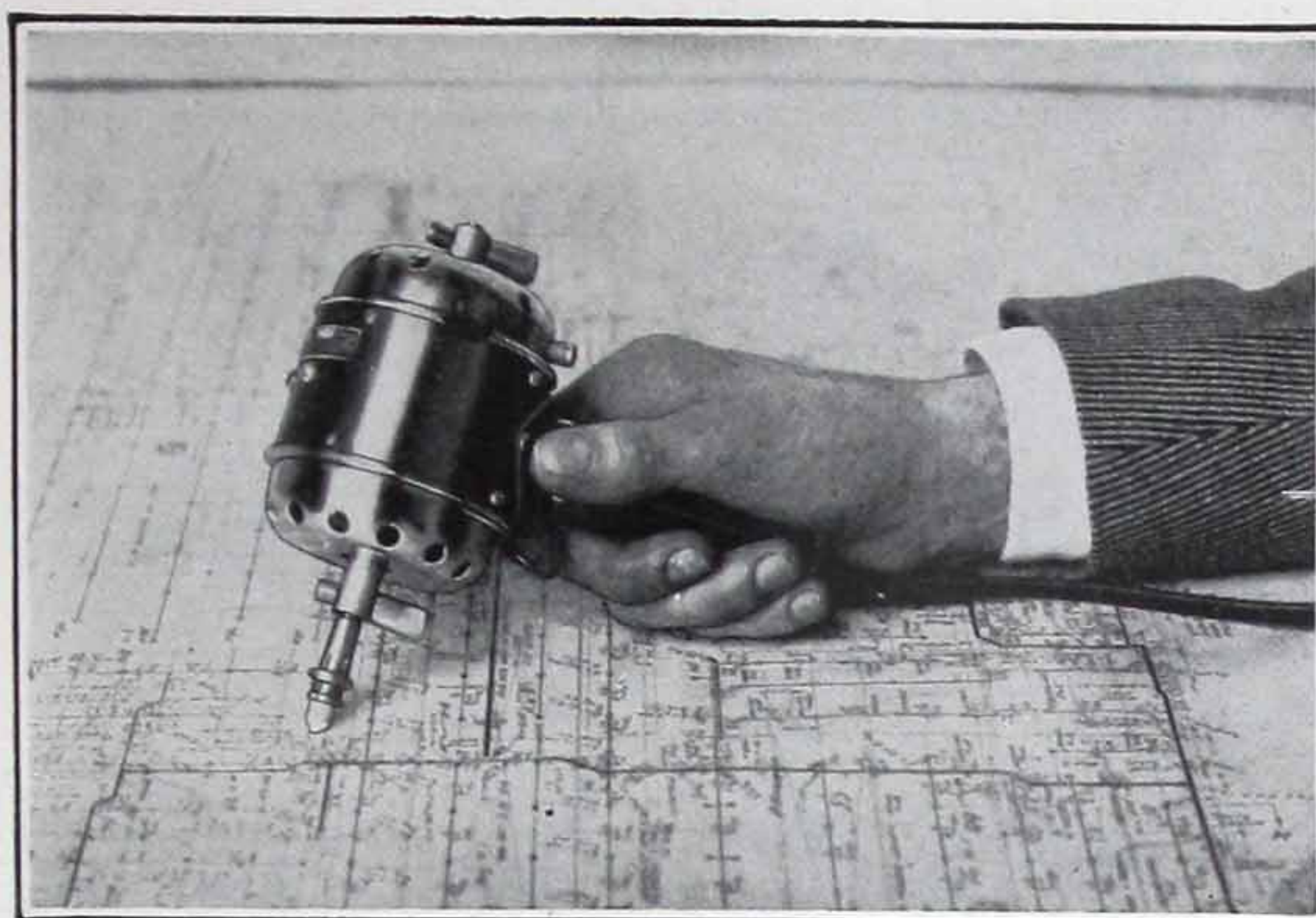
No. 3900A. Wonder Soft Ink Eraser No. 1140, Medium. Gross Dozen



No. 3902. Tri-flex soft ink eraser No. 90, gray ink center with pink rubber outside. Gross Dozen

SEE PRICE LIST IN BACK OF CATALOG

MOTOR DRIVEN ERASERS



No. 3905

The Seymour motor driven eraser is an article of quality designed to give long and satisfactory service.

The erasing and power elements are combined in one unit weighing less than two pounds.

In use the entire weight rests on the drawing surface. The machine is held at an angle of 45 degrees. With this machine a period may easily be removed without disturbing surrounding data. When the current is on the ease with which it can be operated is surprising.

The revolving motor armature produces a gyroscopic action which has a marked tendency to hold the device at the operating angle. In addition to this, the direction of rotation is such that the friction developed by erasing gives the handle a tendency to pull upward. This is counteracted by the weight of the motor held on the operating angle.

Since the whole hand grasps the handle and the weight is on the drawing surface, it is only necessary to guide the machine. No cramps to the fingers result from extended use.

The starting device and variable speeds are controlled by a slight movement of the thumb of the hand in which the machine is held.

The eraser holder is provided with a compression ring that slides over six beveled jaws.

Code Word

No. 3905. Seymour Motor Driven Eraser, complete with 6 dozen assorted erasers. Each..... **XALO**

UNIVERSAL ELECTRIC ERASER

This is a light weight machine that can be held in the hand in the same position as a pen or pencil. Bakelite case $1\frac{3}{4}$ inch diameter, $4\frac{1}{2}$ inches long. Machine starts and stops at touch of forefinger on small switch button. Eraser holder with compression ring which holds erasers firmly in place. Weight 14 ounces.

Code Word

No. 3907. Universal Electric Eraser, complete with sample eraser assortment..... **XALORE**

ERASERS FOR ELECTRIC ERASING MACHINES

Per gross

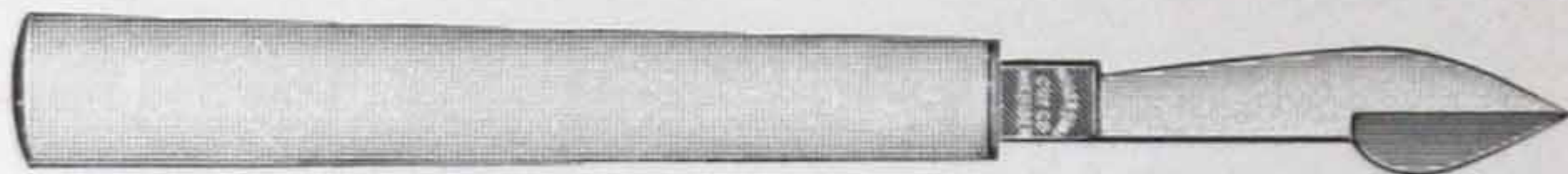
No. 3906-7. Soft red.....
No. 3906-8. Green.....
No. 3906-12. Gray.....
No. 3906-14. Soft pink.....
No. 3906. Assorted.....

SEE PRICE LIST IN BACK OF CATALOG

STEEL ERASERS



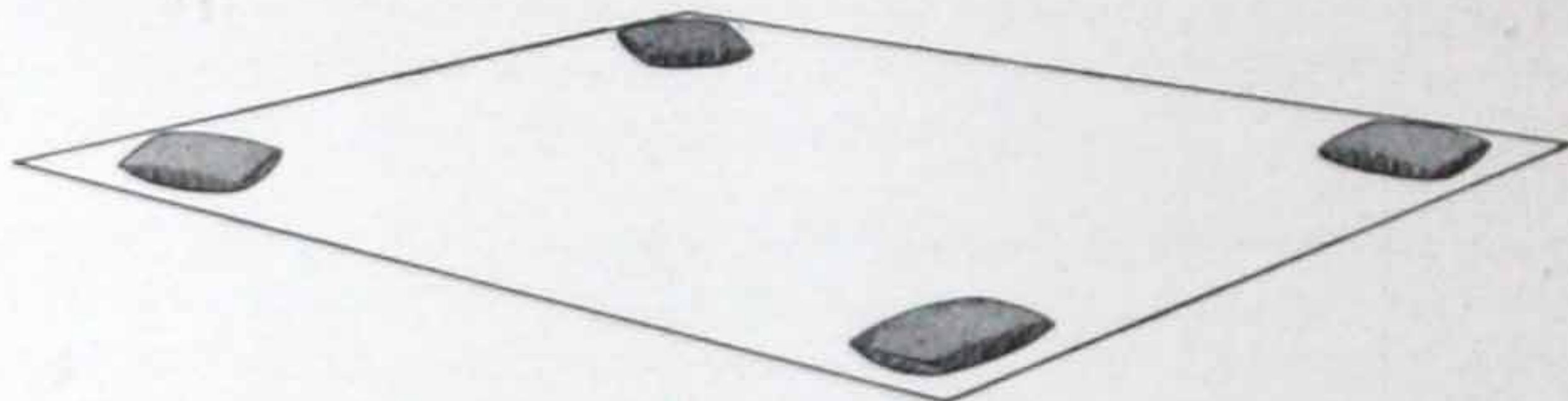
Style "A"



Style "B"

- | | | |
|-----------|--|----------------------------|
| No. 3909. | Steel Eraser, style A, cocoa handle..... | Code Word
XANTHO |
| No. 3910. | Steel Eraser, style B, cocoa handle..... | XEBEC |

CHART AND PAPER WEIGHTS



No. 3913

- | | | |
|-----------|--|--------------------------|
| No. 3913. | Paper Weights, canvas bags loaded with shot, 1½ lbs... | Code Word
XENO |
|-----------|--|--------------------------|



No. 3914

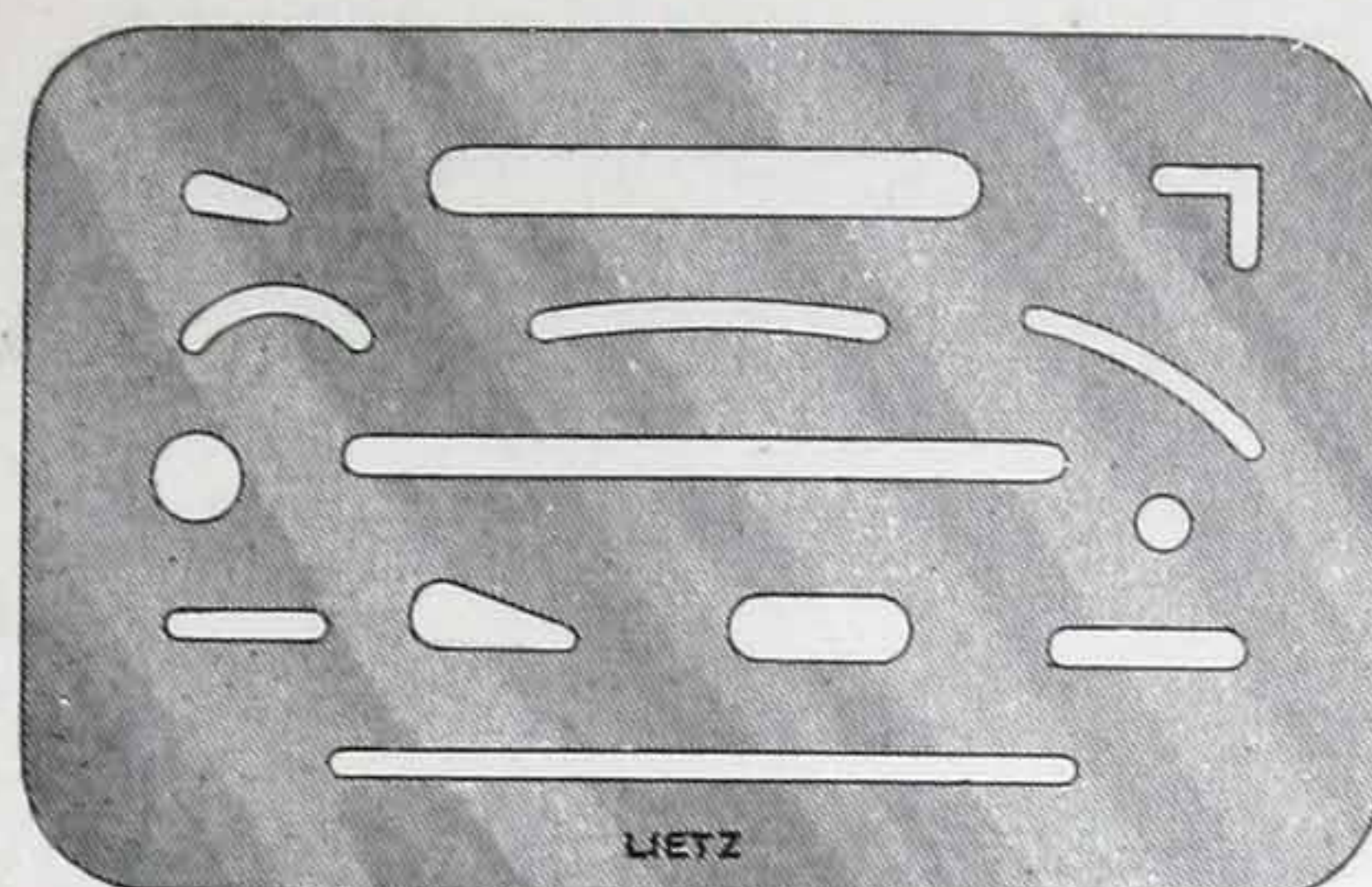


No. 3915

- | | | |
|-----------|--|---------------------------|
| No. 3914. | Square, iron, leather-covered Paper Weight, 2½x2x1½ inches, 1½ lbs..... | Code Word
XENIA |
| No. 3915. | Round, iron, green cloth-covered Paper Weight, 2½ inches diameter, 1 lb..... | XYLOID |

SEE PRICE LIST IN BACK OF CATALOG

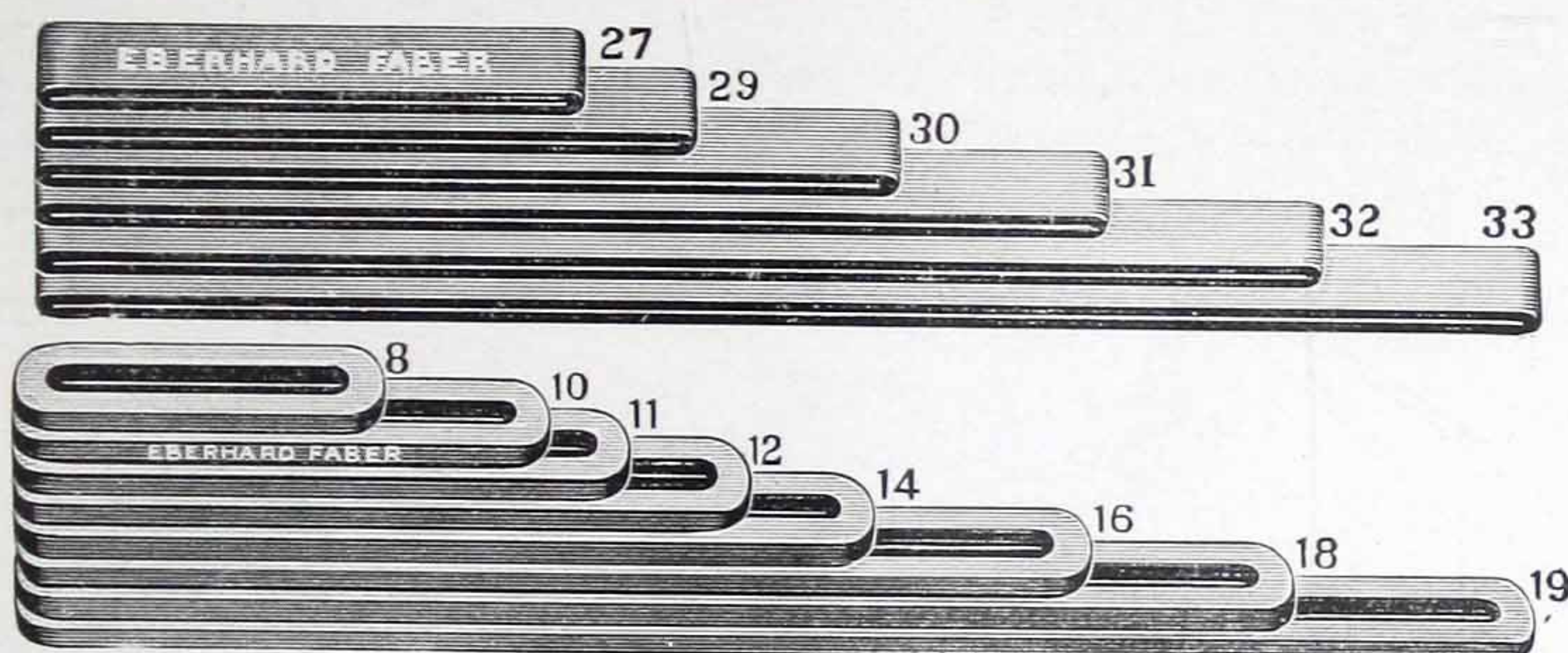
ERASING SHIELDS



Size $2\frac{3}{8} \times 3\frac{3}{4}$ inches.

- | | | |
|-----------|---|----------------|
| No. 3922. | German Silver Erasing Shield, 14 holes..... | Code Word |
| No. 3924. | Razor Steel Erasing Shield, 14 holes..... | YACCA
YAHOO |

GRAY RUBBER BANDS



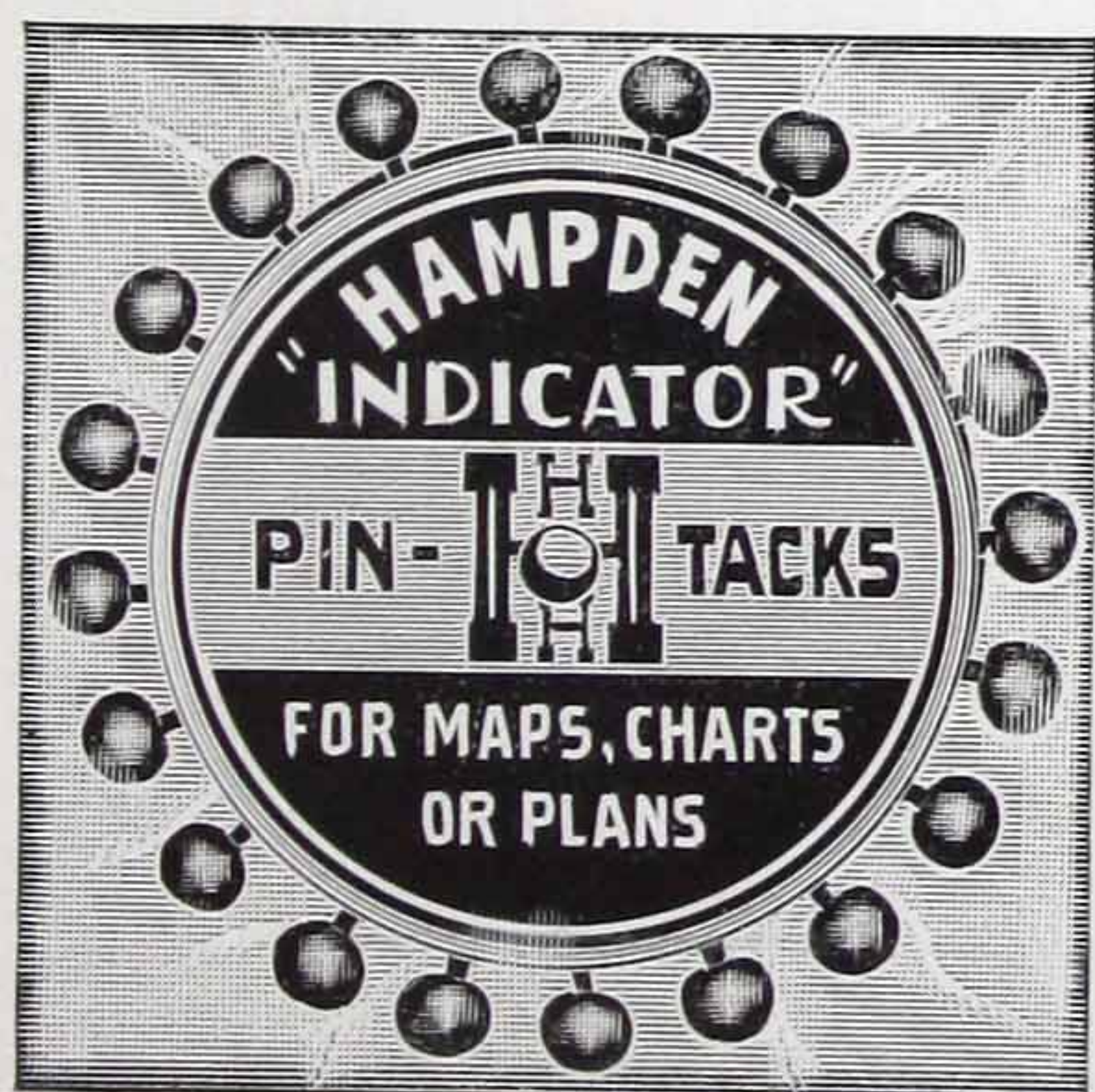
- | | | | |
|-----------|---|-------------------|-------|
| No. 3936. | Gray Rubber Bands $\frac{1}{8}$ in. wide Nos. 27, 29, 30, 31, 32, 33. In boxes containing..... | $\frac{1}{4}$ lb. | 1 lb. |
| No. 3937. | Gray Rubber Bands $\frac{1}{16}$ in. wide. Nos. 8, 10, 11, 12, 14, 16, 18, 19. In boxes containing..... | $\frac{1}{4}$ lb. | 1 lb. |



MAP TACKS

Map tacks with uniform round heads and sharp tapered steel points.
Packed 20 tacks on cardboard disc and made in the following colors:

No. 3939

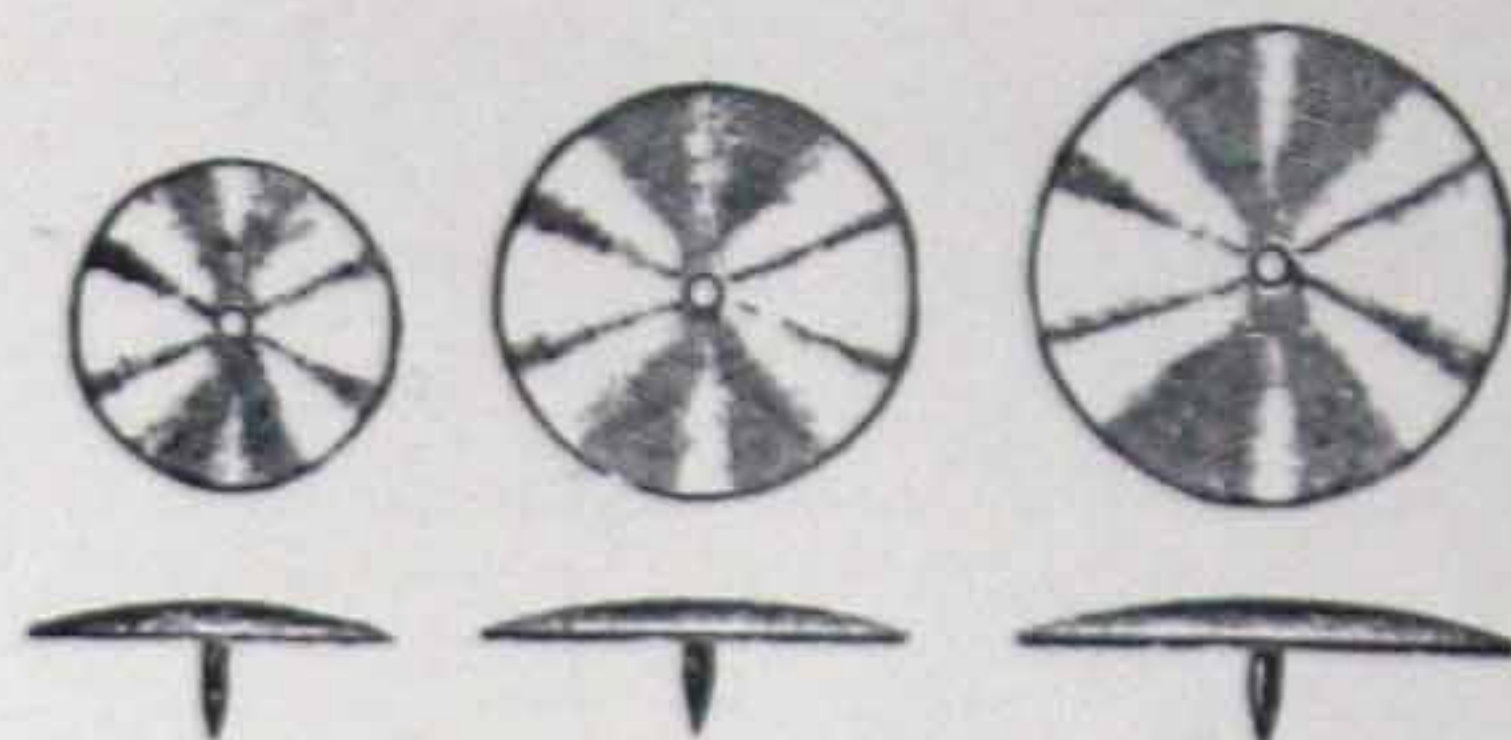


- | | |
|-----------------|----------------|
| 802 Red | 801 Black |
| 803 White | 808 Pink |
| 804 Dark Blue | 805 Orange |
| 807 Brown | 806 Turquoise |
| 810 Light Green | 800 Dark Green |
| 817 Yellow | 820 Gold |

No. 3939. Map tacks listed above,
per disc of 20 tacks.....

SEE PRICE LIST IN BACK OF CATALOG

THUMB TACKS



Nos. 3940-42

GERMAN SILVER—BEST QUALITY

The pins are of hardened steel, screwed in and riveted.

Flat Heads

- | | | |
|-----------|---|-------|
| No. 3940. | German silver Thumb Tacks, flat heads, $\frac{3}{8}$ inch diameter, carded..... | Dozen |
| No. 3941. | German silver Thumb Tacks, flat heads, $\frac{1}{2}$ inch diameter, carded..... | |
| No. 3942. | German silver Thumb Tacks, flat heads, $\frac{5}{8}$ inch diameter, carded..... | |

BRASS—HIGHLY FINISHED

Riveted Pins—One Dozen on a Card



No. 3960 No. 3961 No. 3962

Flat Heads

- | | | | |
|-----------|---|-------|------|
| No. 3960. | Brass Thumb Tacks, flat heads, $\frac{3}{8}$ inch diameter..... | Gross | Doz. |
| No. 3961. | Brass Thumb Tacks, flat heads, $\frac{1}{2}$ inch diameter..... | | |
| No. 3962. | Brass Thumb Tacks, flat heads, $\frac{5}{8}$ inch diameter..... | | |

TWISTOUT THUMB TACKS



Twistout has a small pin, screwed and riveted, leaves a small hole in drawing board and will not bend or break.

Twistout has a flat head with thin edge, thus a scale or straightedge will slip over without interference or injury.

Twistout has a slotted head which affords easy grip of the fingernails. Tack may be removed with ease by a slight twist with the fingers.

Twistout is a Quality Product.

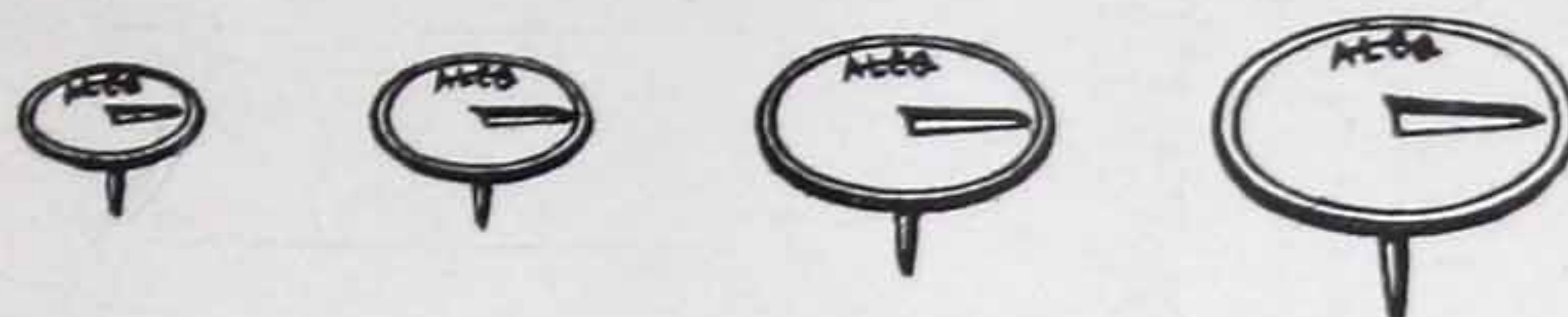
No tack-lifter or puller required.

- | | | | |
|-----------|---|-----------|-------|
| No. 3966. | Twistout Thumbtacks, $\frac{9}{16}$ " dia., packed 1 doz. in box. | Per Gross | Dozen |
|-----------|---|-----------|-------|

SEE PRICE LIST IN BACK OF CATALOG

ONE-PIECE STEEL THUMB TACKS

Finest Quality—Nickel Plated



Nos. 3970-3973

These Tacks are stamped out of one piece of hard steel and are of the best quality, and have needle-finished points.

LOOSE, IN BOXES

1000 to the carton
Box of 100

- No. 3970. Steel Stamped Thumb Tacks, 5/16 in. diameter.....
- No. 3971. Steel Stamped Thumb Tacks, 3/8 in. diameter.....
- No. 3972. Steel Stamped Thumb Tacks, 7/16 in. diameter.....
- No. 3973. Steel Stamped Thumb Tacks, 9/16 in. diameter.....



No. 3974

FOR SCHOOL USE

Per box

- No. 3974A. Steel Stamped Thumb Tacks, 3/8 in. diameter, 1 dozen in tin box.....
- No. 3974B. Steel Stamped Thumb Tacks, 7/16 in. diameter, 1 dozen in tin box.....

SOLID HEAD STEEL TACKS

Nickel Plated



Very strong and durable. Pins will not pull out or push through.

1000 to the carton
Box of 100

- No. 3976. Solid Steel Thumb Tacks, 3/8 in. diameter.....
- No. 3977. Solid Steel Thumb Tacks, 7/16 in. diameter.....
- No. 3978. Solid Steel Thumb Tacks, 1/2 in. diameter.....
- No. 3979. Long Point Solid Steel Tacks 1/2 in. diam. 1/2 in. point.....



No. 3979

TACK LIFTERS



No. 3980



No. 3981

- No. 3980. Tack Lifter, bronzed brass.....
- No. 3981. Improved Tack Lifter and Paper Cutter, nickel plated.....

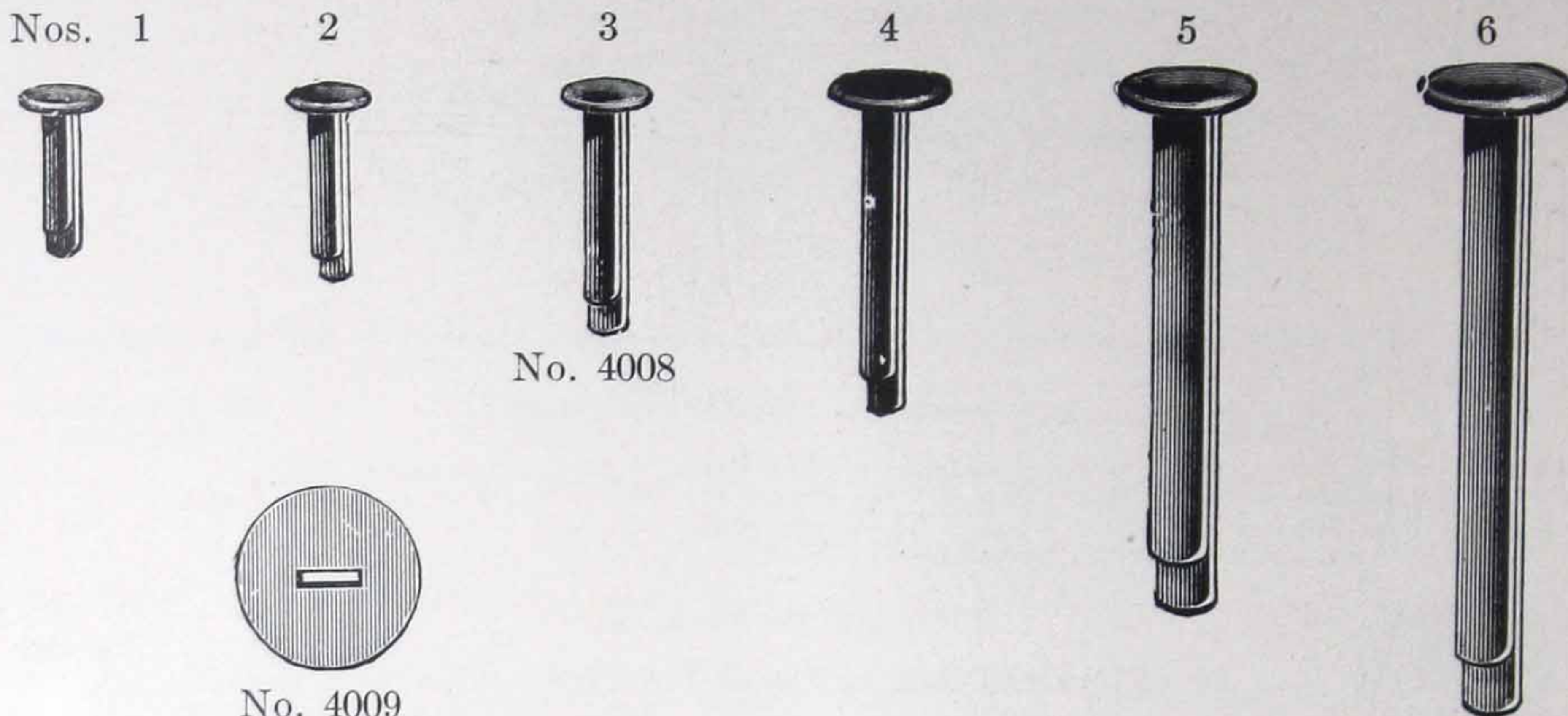
Each

Tack Lifter No. 3981, owing to its beveled V-shape claw, catches the tack on the outside points of its circle, and by simply pushing the lifter forward, the tack is lifted without bending the pin.

For Combination Steel Lead Pencil File and Tack Lifter see Catalog No. 3843, page 395.

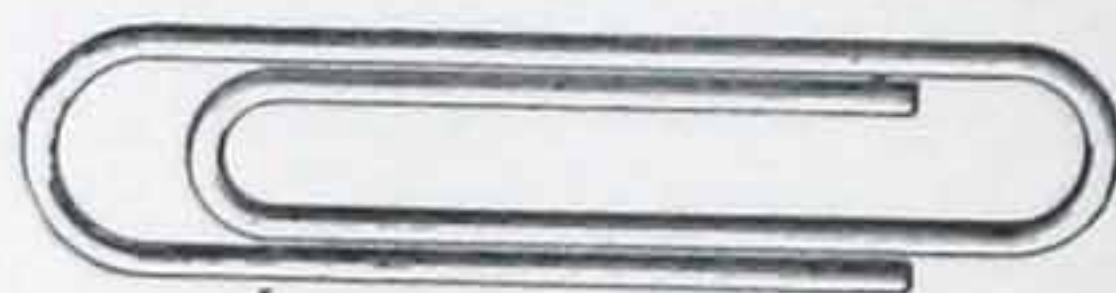
SEE PRICE LIST IN BACK OF CATALOG

BRASS PAPER FASTENERS



- No. 4008.** Paper Fasteners, round heads.
- | | | | | | | |
|-----------------|---------------|---------------|---------------|---|----------------|----------------|
| Number— | 1 | 2 | 3 | 4 | 5 | 6 |
| Length, inches— | $\frac{1}{4}$ | $\frac{1}{2}$ | $\frac{3}{4}$ | 1 | $1\frac{1}{4}$ | $1\frac{1}{2}$ |
| Per box of 100 | | | | | | |
| Per box of 1000 | | | | | | |
- No. 4009.** Brass Washers for paper fasteners. Per 1000.....

GEM PAPER CLIPS



No. 4012 Exact size

- No. 4012.** Plain Gem Clips No. 1.....
- No. 4012C.** Corrugated Gem Clips No. 1.....
- No. 4013.** Plain Gem Clips No. 3.....
- No. 4013C.** Corrugated Gem Clips No. 3.....

1000 to the carton
Box of 100



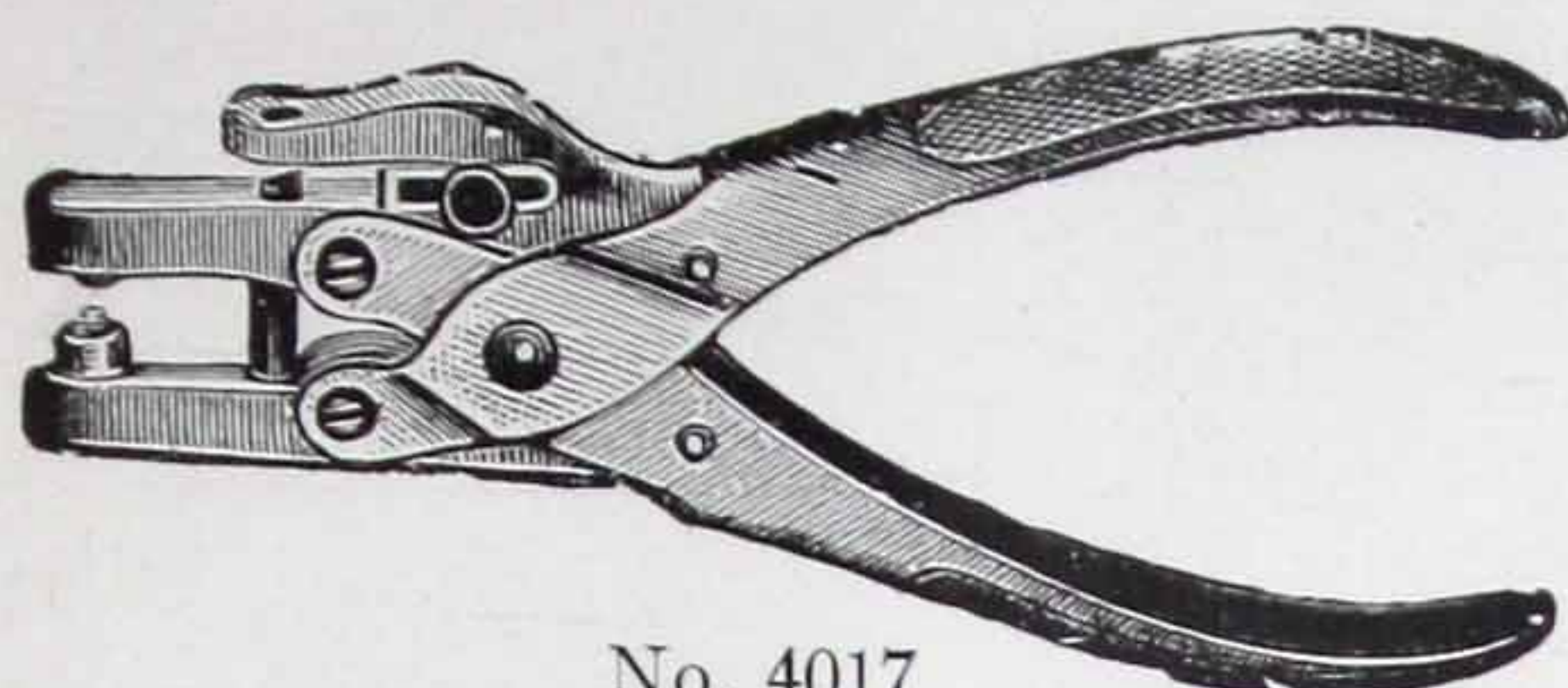
Nos. 4014A-C

PAPER CLIPS

- | | Doz. | Each |
|--|------|------|
| No. 4014A. Paper Clips, $1\frac{1}{4}$ in. long.... | | |
| No. 4014B. Paper Clips, $2\frac{1}{4}$ in. long.... | | |
| No. 4014C. Paper Clips, 3 in. long..... | | |

SEE PRICE LIST IN BACK OF CATALOG

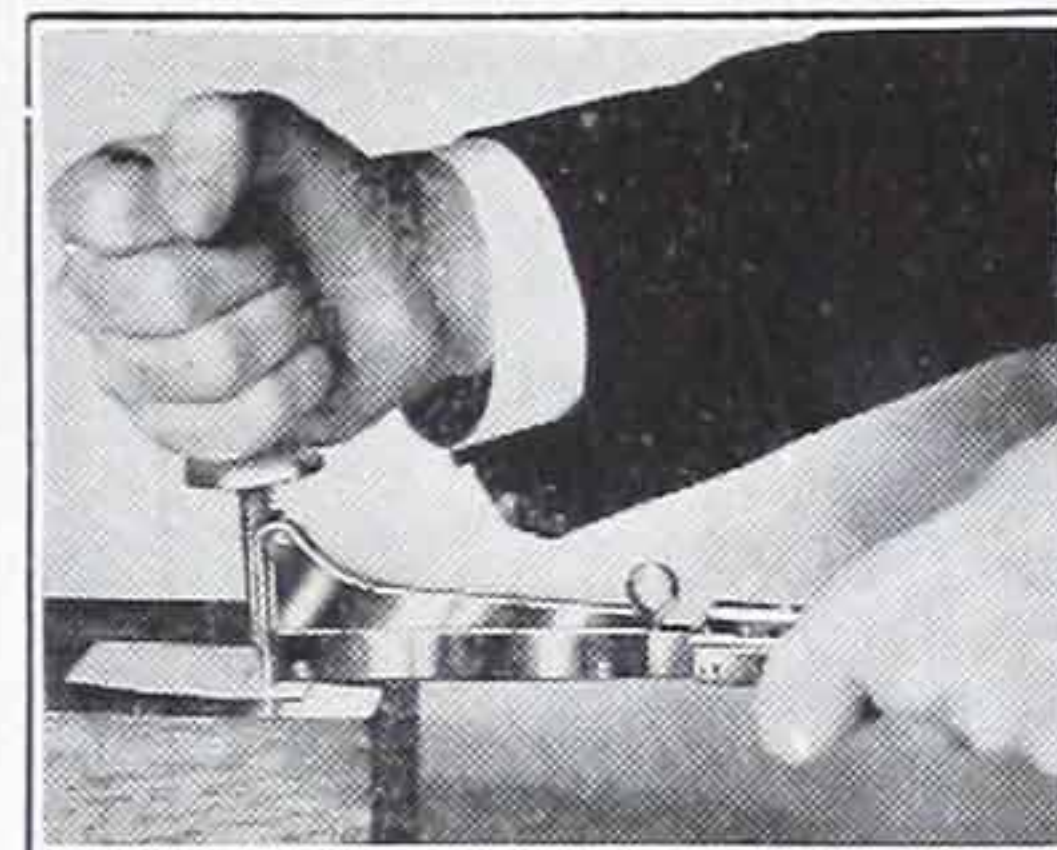
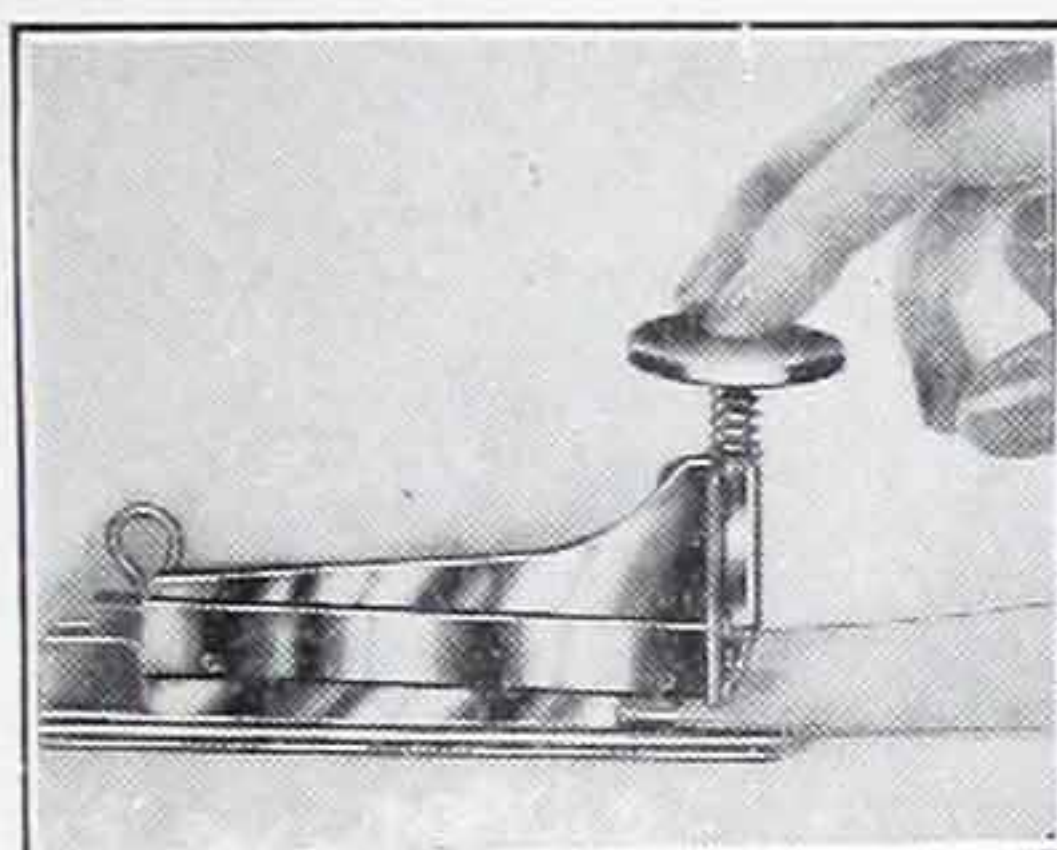
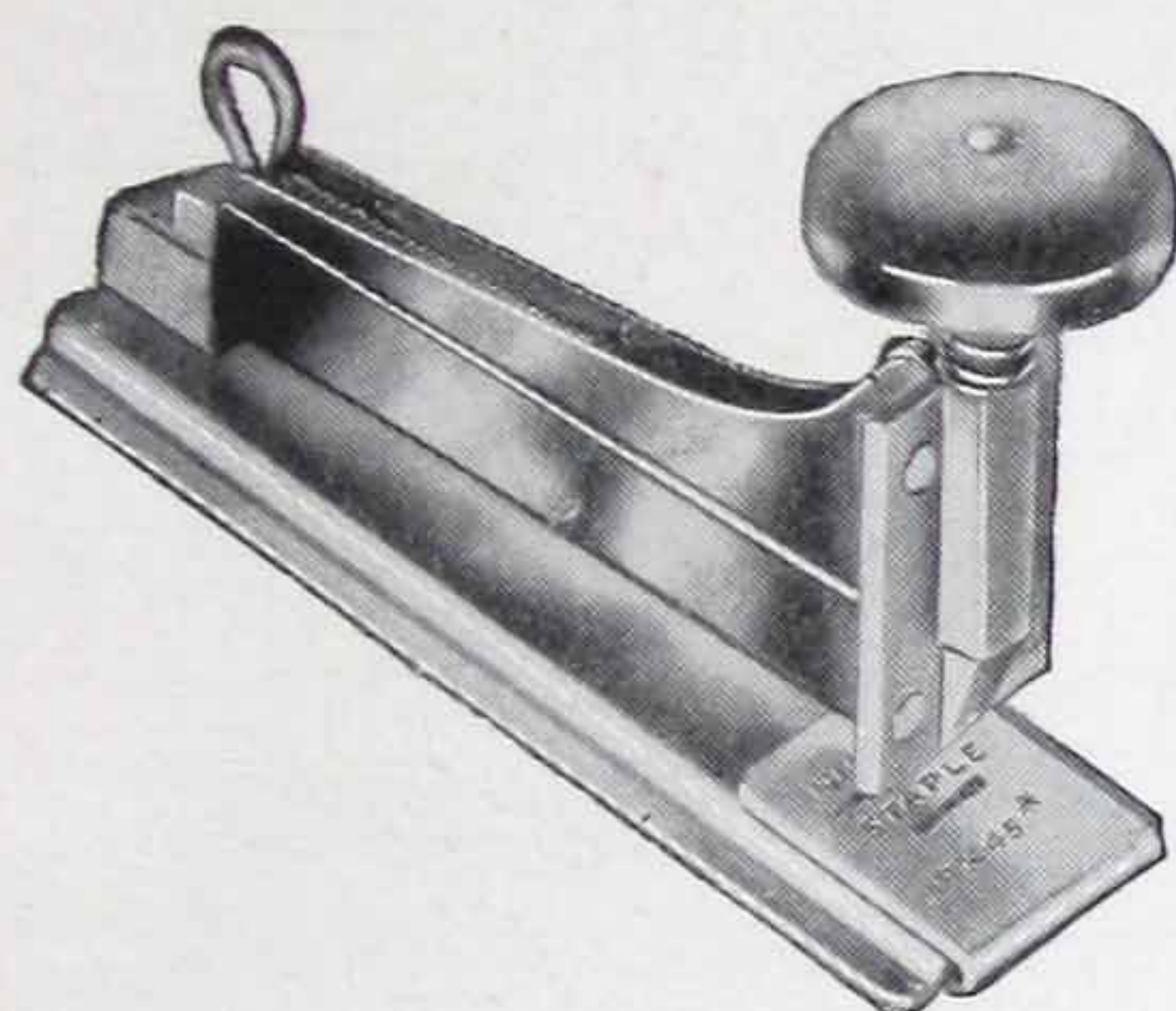
THE TRIUMPH EYELET PUNCH AND FASTENER



No. 4017

- | | | | |
|------------|---|------------|--------------|
| No. 4017. | Triumph Eyelet Punch and Fastener..... | Code Word | YAWL |
| No. 4017A. | Eyelets for Triumph Punch and Fastener— | Box of 250 | |
| | Short..... | | YAWN |
| | Medium long..... | | YAWP |
| | Long..... | | YCLAD |

MARKWELL "RX" STAPLER



No. 4022

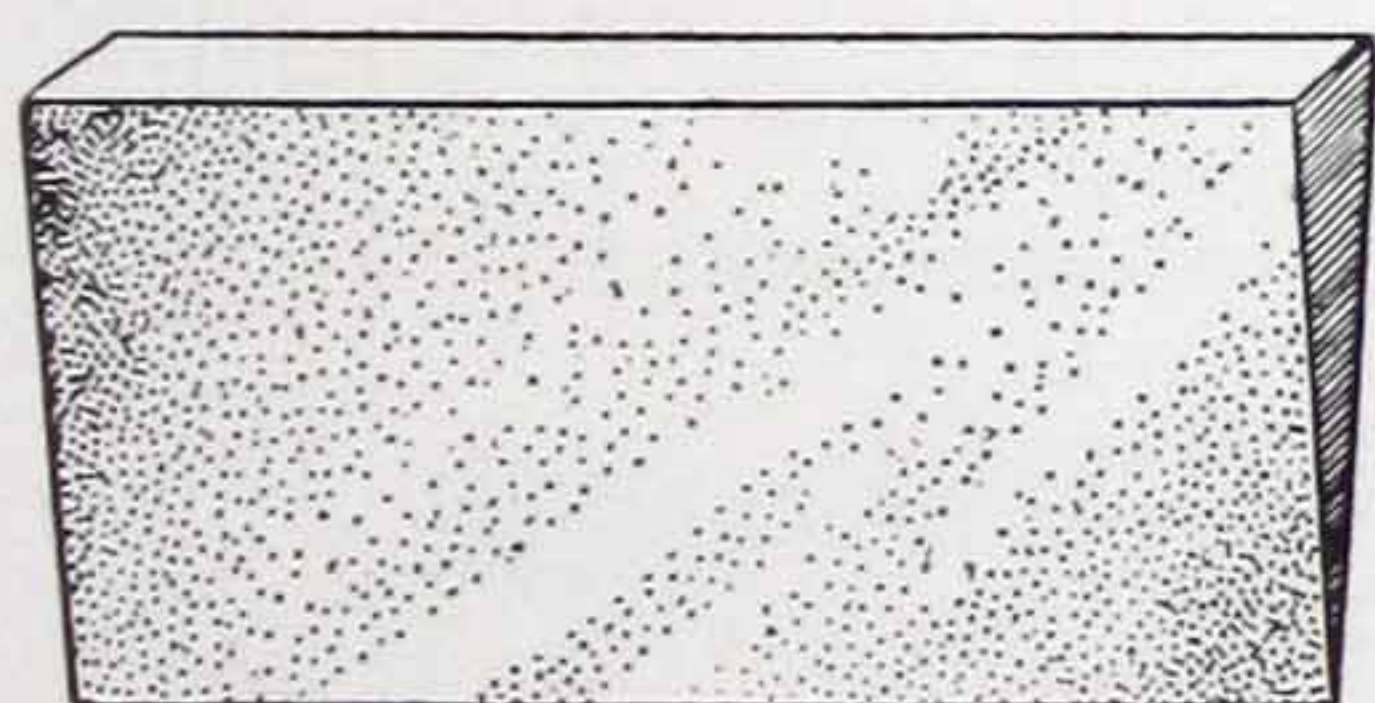
The Markwell "RX" Stapler staples or pins up to 30 sheets and loads with 100 staples. It can also be used for tacking drawings and tracings to the drawing board or tags to shipping boxes or posting bulletins.

Code Word

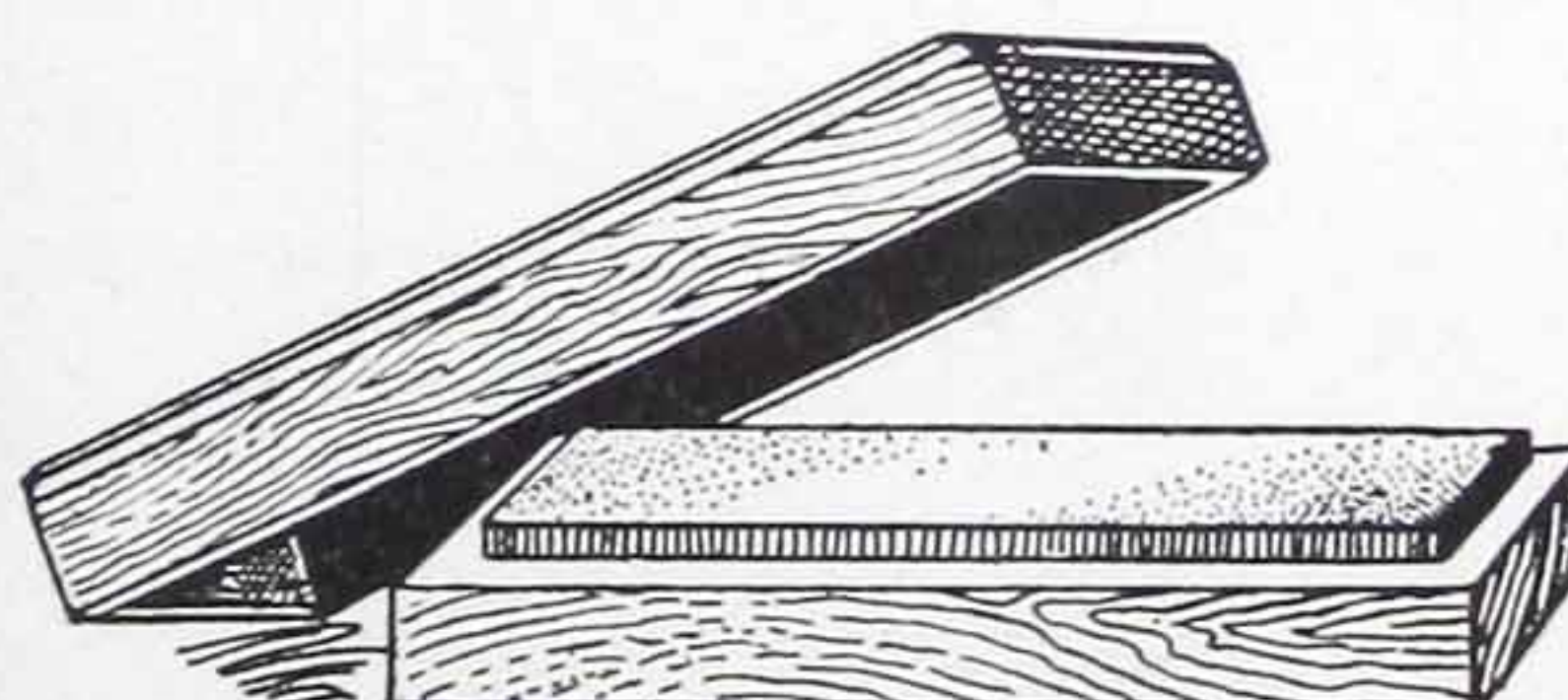
- | | | |
|-----------|--|---------------|
| No. 4022. | Markwell "RX" Stapler with 1000 staples..... | YELSUM |
| No. 4023. | Frozen Staples for No. 4022 Stapler. Carton contain-
ing 10 boxes of 1000 staples each..... | YELTO |

OIL STONES

For sharpening Drawing Tools.



No. 4042



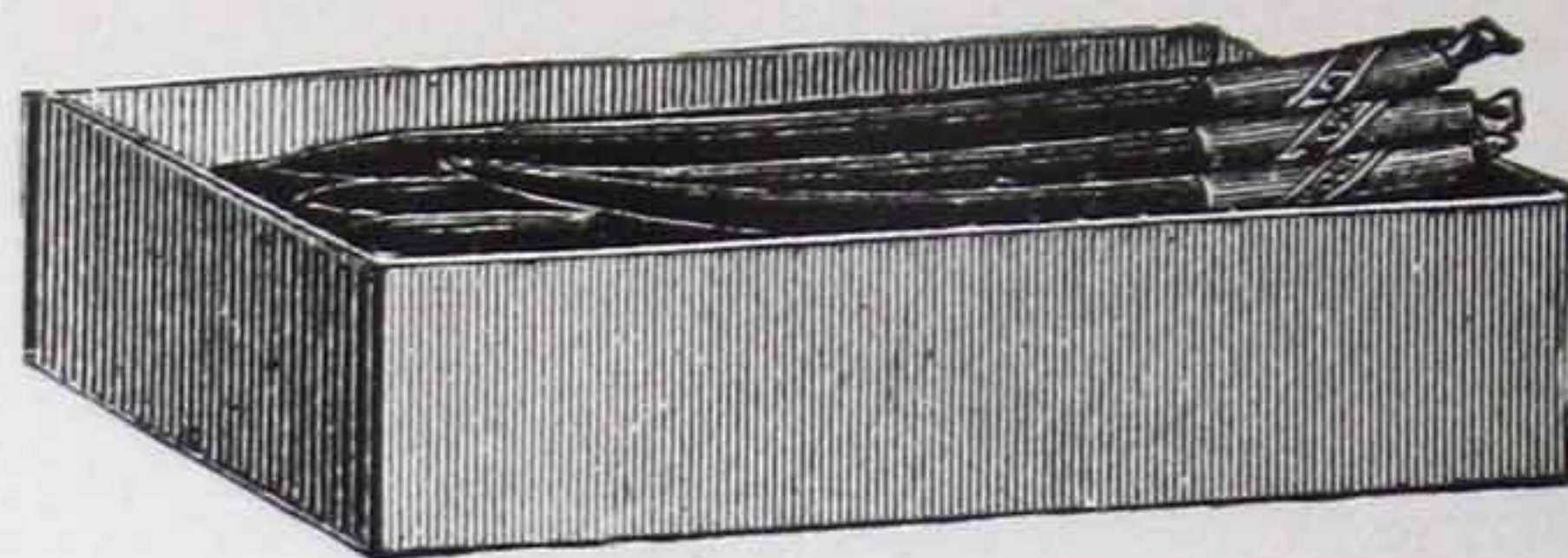
Nos. 4044-46

Code Word

- | | | |
|-----------|---|--------------|
| No. 4042. | Arkansas Oil Stone, wedge shape, about 1 1/4 x 3 in. Each.. | YOJAN |
| No. 4044. | Arkansas Oil Stone, in case with cover, 3 1/2 x 1 in. Each .. | YOKE |
| No. 4046. | Arkansas Oil Stone, in case with cover, 5 x 2 in. Each.... | YOKEL |

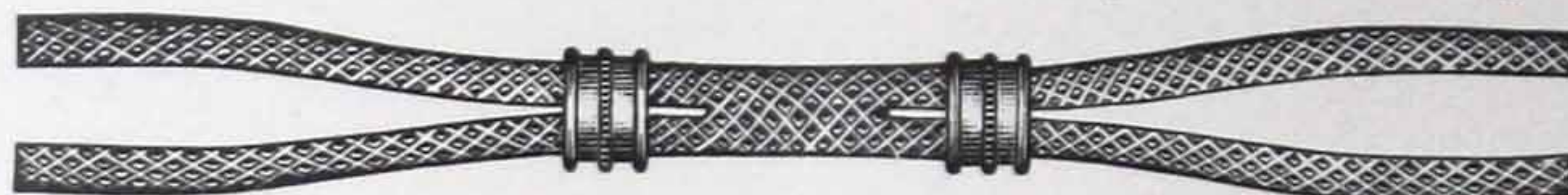
SEE PRICE LIST IN BACK OF CATALOG

CHARCOAL



Per Box

- No. 4050.** Fine American Willow Charcoal, 50 sticks in a box, 6 in. long.
No. 4051. French Charcoal, Rouget's Extra Fine; ends wrapped in foil, 25 sticks to the box. In No. 1 Hard, No. 2 Medium, No. 3 Soft.
per box of one grade



No. 4063

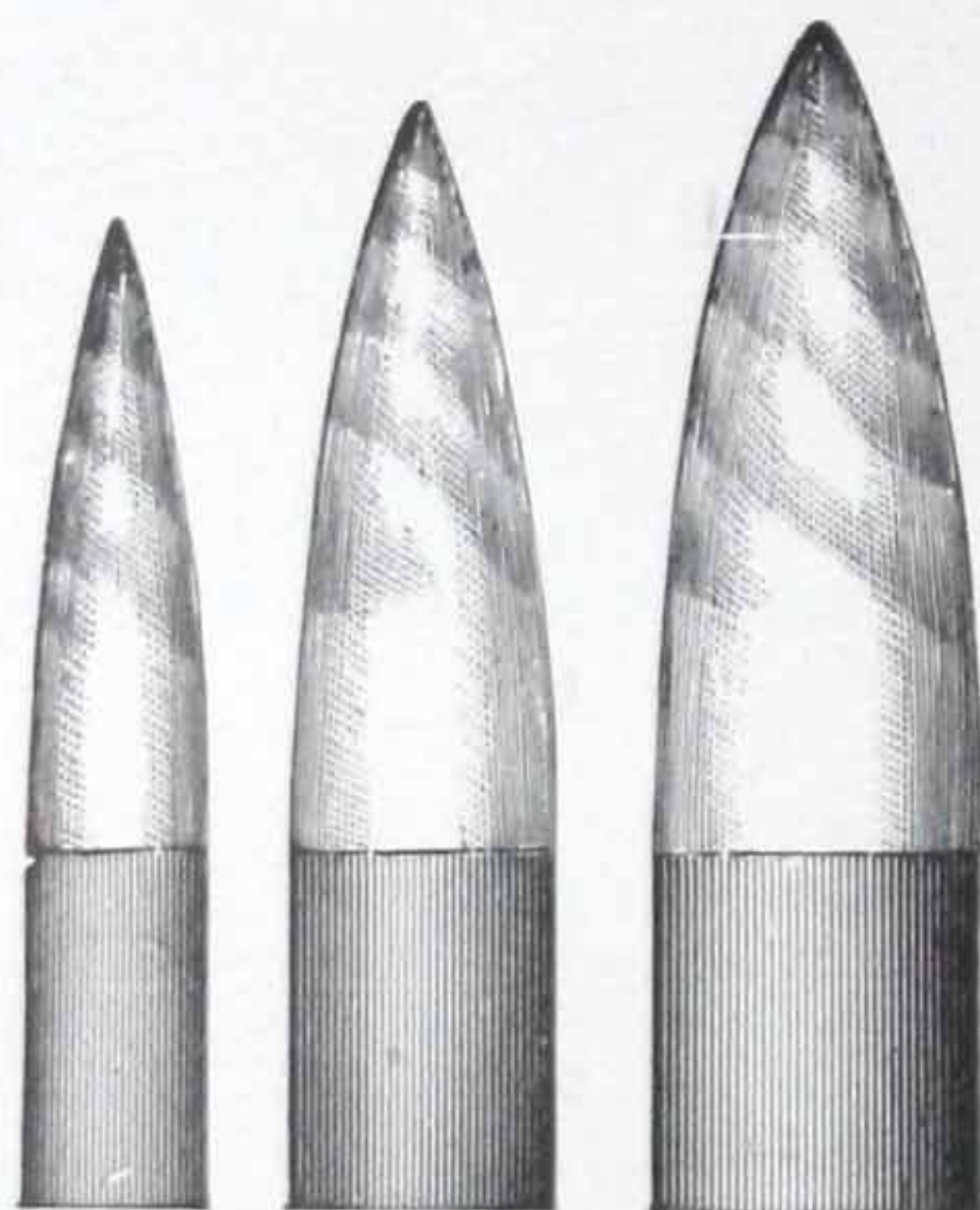
Doz. Each

- No. 4063.** Brass Holders for charcoal or crayons, 5 in.....

STOMPS FOR CRAYON SHADING

- No. 4066.** French Gray Paper Stomps for Crayon Shading.

No.—	2	4	6	8
Doz.....				



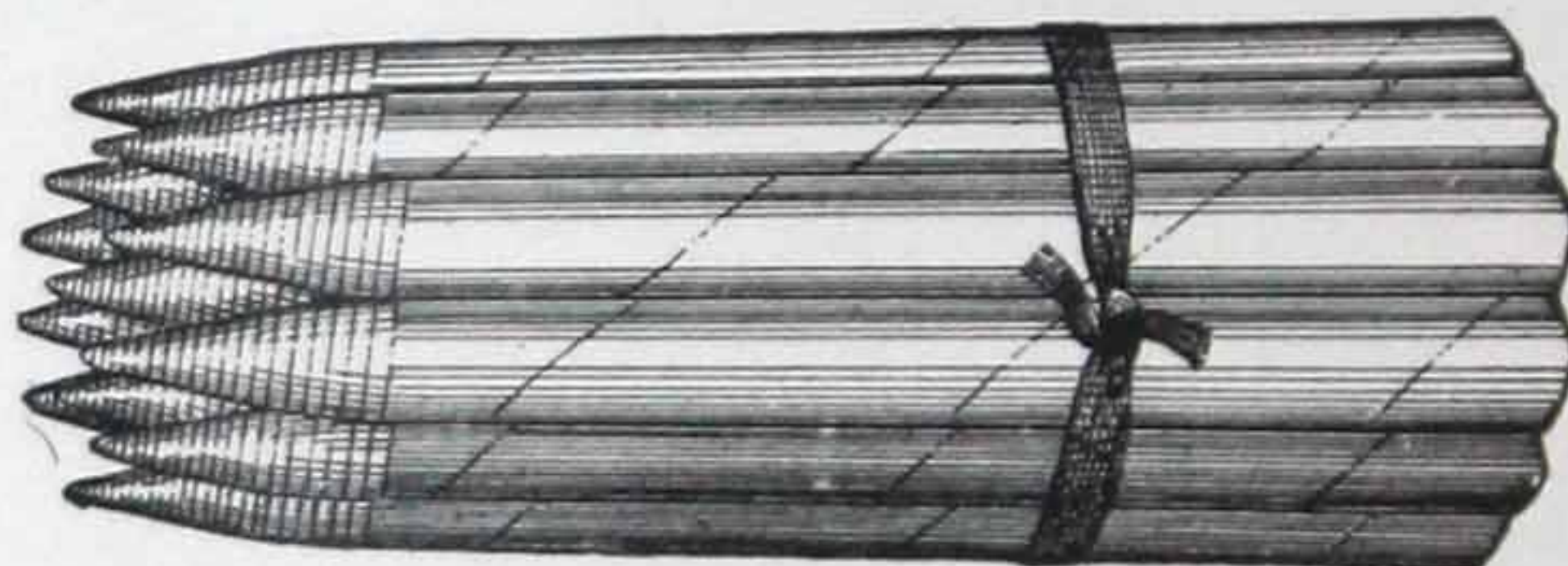
No. 2

No. 4

No. 6

No. 4066

TORTILLON STOMPS



No. 4068

Dozen

- No. 4068.** Tortillon Stomps, gray or white, thin paper, 3 in. long.....

CHAMOIS SKINS

- No. 4072.** Chamois Skins, best quality, 5½x8½ inches..... Each

ATOMIZER AND FIXATIF



No. 4075

Each



No 4078

- No. 4075.** Atomizer, nicked, folding.....
No. 4078. Paramount Fixatif for pastel and charcoal drawings.
 in bottles. 2 oz. 4 oz. Pint Quart
 Each.....

SEE PRICE LIST IN BACK OF CATALOG



Antwerp Blue
Bistre
Blue Black
Bright Crimson
Bright Red
Brown Ochre

WATER COLORS

WINSOR & NEWTON'S WATER COLORS

In whole and half Pans and Tubes.



Class 1

Burnt Sienna	Hooker's Green, No. 2	Peach Black
Burnt Umber	Indian Red	Permanent Blue
Charcoal Gray	Ivory Black	Prussian Blue
Chrome Lemon	Lamp Black	Prussian Green
Chrome Yellow	Light Red	Raw Sienna
Chrome Deep	Mauve	Raw Umber
Chrome Orange	Naples Yellow	Sap Green
Dragon's Blood	Neutral Tint	Terre Verte
Emerald Green	New Blue	Vandyke Brown
Gamboge	Olive Green	Venetian Red
Hooker's Green, No. 1	Payne's Gray	Yellow Ochre

No. 4101.	W. & N. Water Colors, Class 1, whole pan or tube.....	Doz.	Each
No. 4101½.	W. & N. Water Colors, Class 1, half pan.....		

Class 2

Alizarin Carmine	Leitch's Blue	Crimson Lake	Scarlet Lake
Alizarin Crimson	Mars Yellow	Cyanine Blue	Sepia
Alizarin Scarlet	Purple Lake	King's Yellow	Spectrum Red
Brown Madder	Brown Madder, Alizarin	Indigo	Vermilion
Italian Pink	Brown Pink	Rose Madder, Alizarin	Warm Sepia

No. 4102.	W. & N. Water Colors, Class 2, whole pan or tube.....	Doz.	Each
No. 4102½.	W. & N. Water Colors, Class 2, half pan.....		

Class 3

Cadmium Yellow, Pale	Cobalt Green	Mineral Violet	Rose Carthame
Cadmium Yellow	Cobalt Violet	Orange Vermilion	Scarlet Vermilion
Cadmium Yellow, Deep	French Blue	Oxide of Chromium	Spectrum Violet
Cadmium Orange	French Ultramarine	Oxide of Chromium	Spectrum Yellow
Cerulean Blue	Indian Yellow, No. 2	Trans.	Viridian
Cobalt Blue	Lemon Yellow		

No. 4103.	W. & N. Water Colors, Class 3, whole pan or tube.....	Doz.	Each
No. 4103½.	W. & N. Water Colors, Class 3, half pan.....		

Class 4

Aureolin	Carmine	Madder Lake	Rose Madder
Aurora Yellow	Field's Orange Vermilion	Purple Madder	Violet Carmine
Cadmium Red			

No. 4104.	W. & N. Water Colors, Class 4, whole pan or tube.....	Doz.	Each
No. 4104½.	W. & N. Water Colors, Class 4, half pan.....		

WINSOR & NEWTON'S CHINESE WHITE

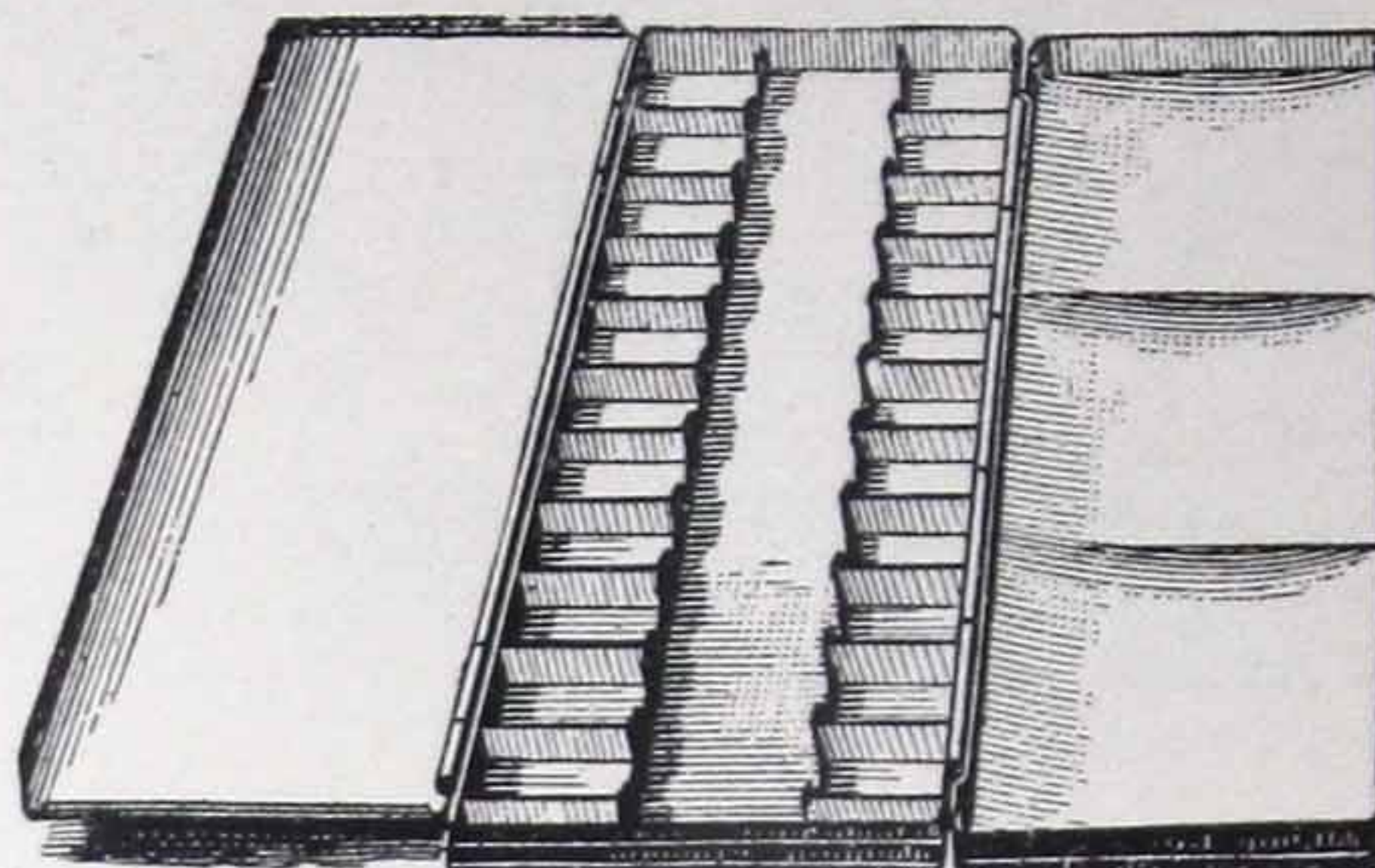
In Tubes or Bottles

No. 4110.	W. & N. Chinese White, small tube, ½x2 inches.....	Doz.	Each
No. 4111.	W. & N. Chinese White, large tube, ¾x2 inches.....		
No. 4113.	W. & N. Chinese White, small bottle.....		

SEE PRICE LIST IN BACK OF CATALOG

EMPTY JAPANNED TIN BOXES

With space for brushes.



- | | | |
|------------|---|----------------------------|
| No. 4140A. | Empty Color Box for 6 whole or 12 half pans..... | Code Word
YOLECK |
| No. 4140B. | Empty Color Box for 12 whole or 24 half pans..... | YOLED |
| No. 4140C. | Empty Color Box for 18 whole or 36 half pans..... | YOLO |



SHOW CARD COLORS

Sargent Tempera and Water Resistant Show Card Colors are ground in a revolutionary colloid base, a homogeneous emulsion which produces excellent working quality. They are noted for their super-brilliance of pigments. They are non-settling and non-bleeding, of smooth consistency, free from grit, can be used with ordinary lettering brush or, when thinned down, with lettering pen or air brush.

Made in the following Colors:

White	Spectral Red	Turquoise Blue
Spectral Yellow	Maroon	Spectral Blue Green
Medium Yellow	Magenta	Dark Green
Dark Yellow	Spectral Red Violet	Spectral Green
Spectral Yellow Orange	Lavender	Emerald Green
Spectral Orange (Mineral)	Spectral Violet	Spectral Yellow Green
Orange	Royal Purple	Golden Brown
Spectral Red Orange	Spectral Blue Violet	Burnt Sienna
Vermilion	Dark Blue	Burnt Umber
Light Red	Spectral Blue	Black
Dark Red	Light Blue	Gray

No. 4150. Sargent's Show Card Colors, glass screw cap jars.

2 oz. 8 oz. 16 oz.

No. 4151. Sargent's Gold and Silver Show Card Colors, glass screw cap jars.

1 oz. 2 oz.

SEE PRICE LIST IN BACK OF CATALOG

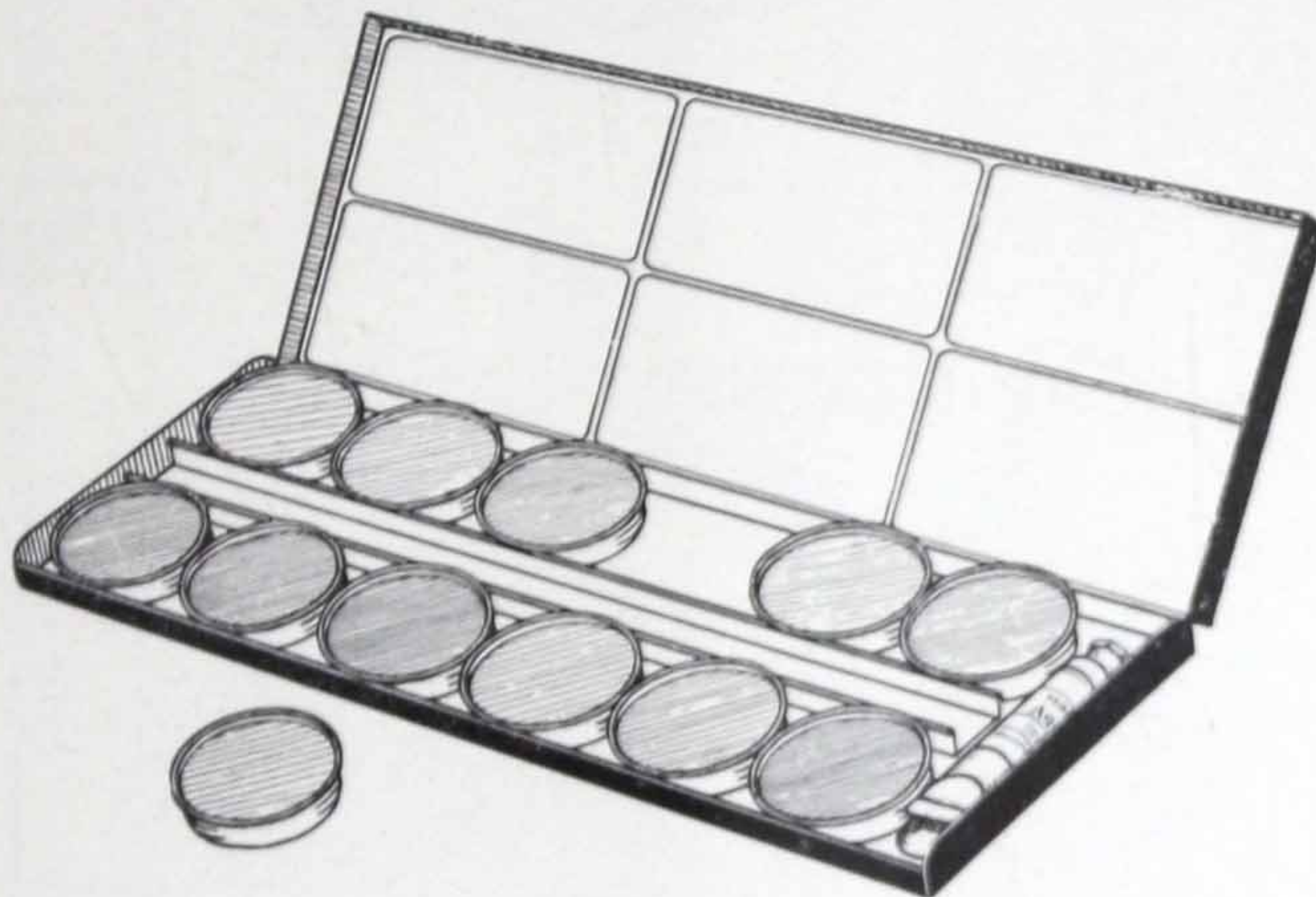
WATER COLORS IN JAPANNED TIN BOXES



No. 4165

- No. 4165.** Student's Water Color Box containing 8 high grade colors with one No. 7 Camel Hair Brush. **YUBEL**

Code Word



No. 4168

- No. 4168.** Box containing 12 shades of opaque water colors and a tube of Chinese White. The box is constructed of heavy metal with an attractive silver finish, size 9x3³/₈ inches. Colors in handy removable metal pans. **YUDOC**

Code Word

COLOR REFILLS

Round metal pans in the following colors:

Cadmium Yellow—Light	Carmin	French Green
Cadmium Orange	Violet	Viridian
Yellow Ochre	Ultra-marine	Burnt Sienna
Vermilion	Prussian Blue	Black

- No. 04168.** Dozen. Each. **YUDOCK**

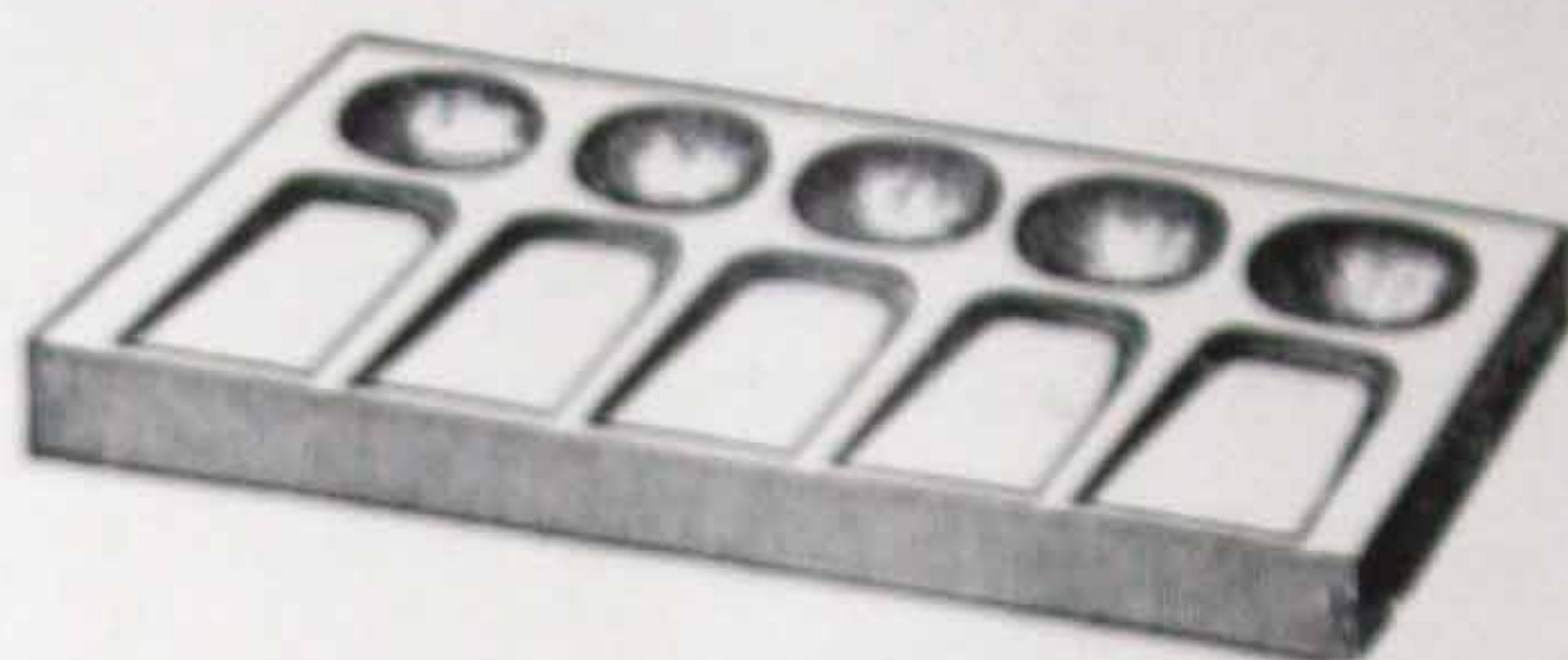
Code Word

SEE PRICE LIST IN BACK OF CATALOG

ARTISTS' CHINAWARE



No. 4177. China Color Slants, 5 slopes, $3\frac{1}{8} \times 8$ inches..... Code Word **YULELOG**



No. 4195

No. 4194. China Color Slants, 3 wells and 3 slopes, $2\frac{1}{4} \times 4$ in... Code Word **ZANY**
 No. 4195. China Color Slants, 5 wells and 5 slopes, $4\frac{1}{4} \times 7\frac{3}{4}$ in... Code Word **ZAPTIAH**

CABINET NEST SAUCERS



No. 4200

No. 4200. China Cabinet Nest Saucers, 6 in set, $2\frac{3}{4}$ inches diameter..... Code Word **ZEALOT**
 No. 4202. China Cabinet Nest Saucers, 6 in set, $3\frac{1}{4}$ inches diameter..... Code Word **ZEBRA**

WATER GLASSES



No. 4206



No. 4209

No. 4206. Water Glass with two lips, $2\frac{1}{2}$ inches diameter..... Code Word **ZENANA**
 No. 4209. Water Cups, enameled tin, 3 inches diameter..... Code Word **ZEOLITE**

SEE PRICE LIST IN BACK OF CATALOG

BRUSHES FOR WATER COLOR PAINTING

We offer a select assortment of Quality Brushes. They are guaranteed to contain the proper amount of hairs, and to be made of genuine sable or camel hair.



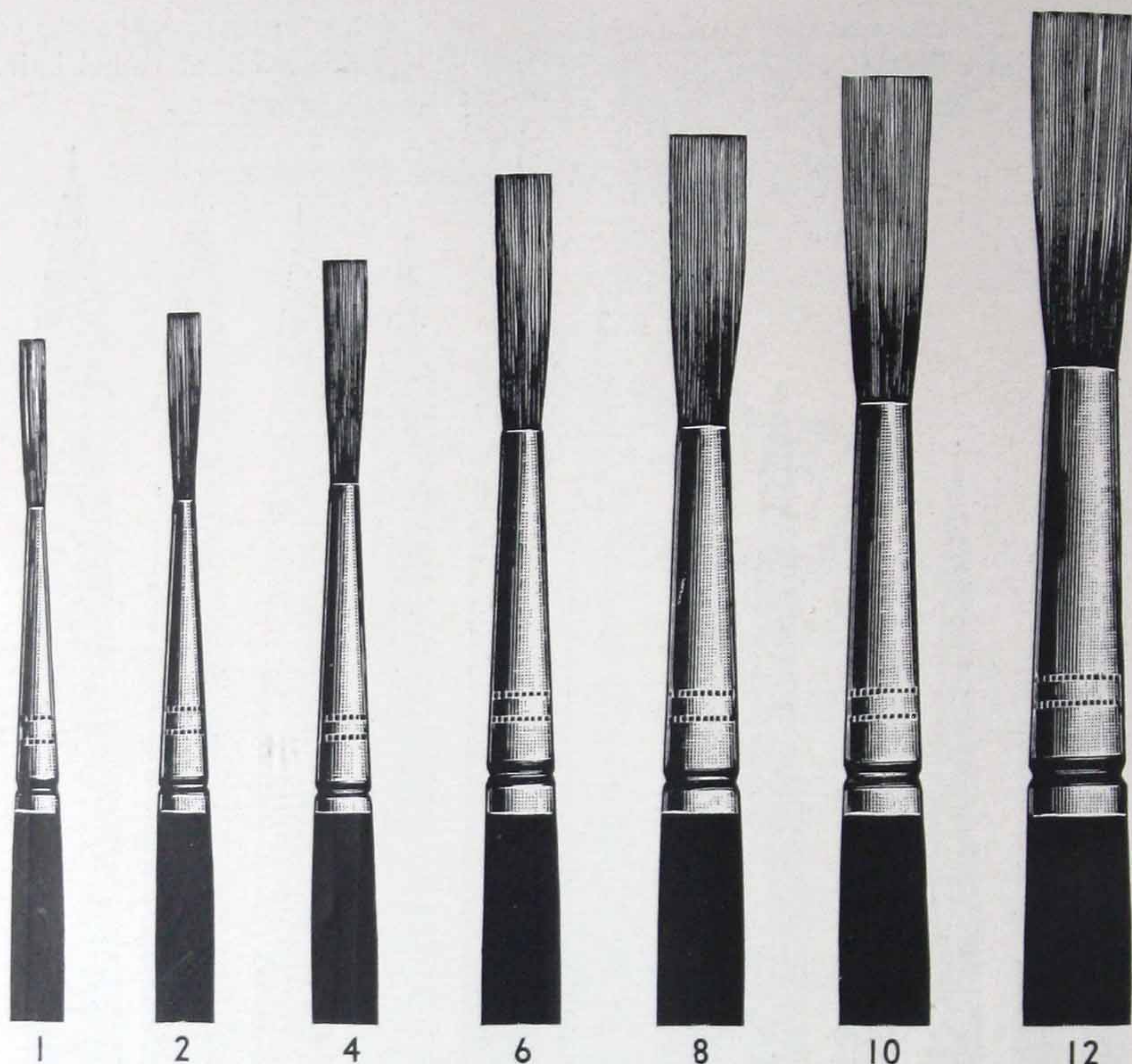
No. 4212. Finest quality **Red Sable Brushes**, nicked ferrules, black polished handles.
No. 1 2 3 4 5 6 7 8 9 10 11 12
Each

No. 4215. **Camel Hair Brushes**, finest selected quality camel hair; in nicked ferrules, polished handles.
No. 1 2 4 6 7 8 10 12
Each

No. 4216. **Camel Hair Brushes**, school quality, metal ferrules, polished handles.
No. 1 2 3 4 5 6 7
Each

SEE PRICE LIST IN BACK OF CATALOG

RED SABLE SHOW CARD BRUSHES



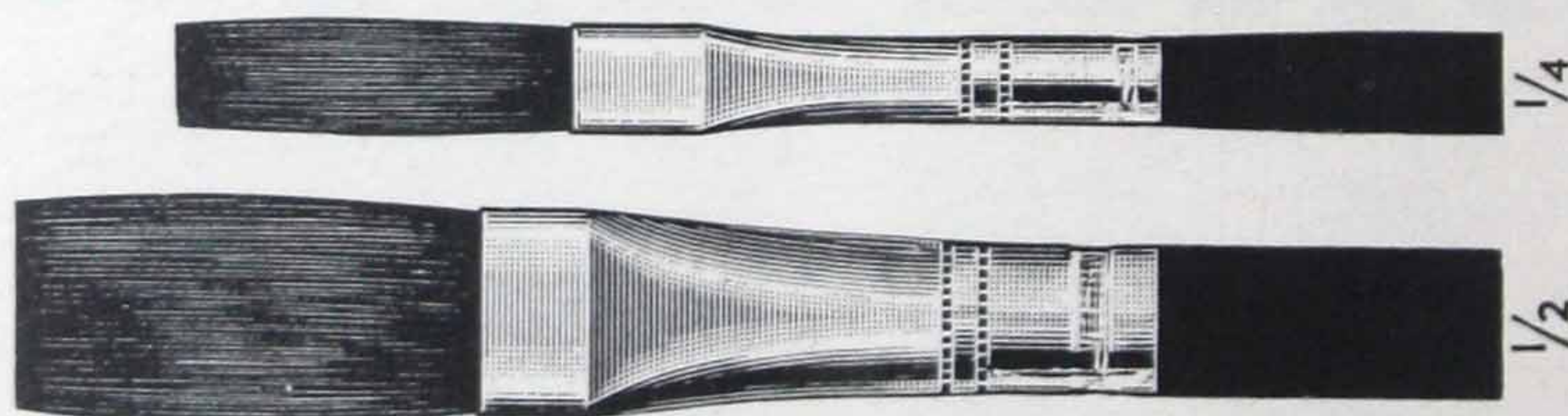
Illustrations actual size

These brushes are made with great care especially for show card writing. Made of pure sable hair in seamless nickeled ferrules, short polished handles.

No. 4213. Red Sable Show Card Brushes.

No.	1	2	4	6	8	10	12
Each							

OX HAIR "ONE STROKE" BRUSHES



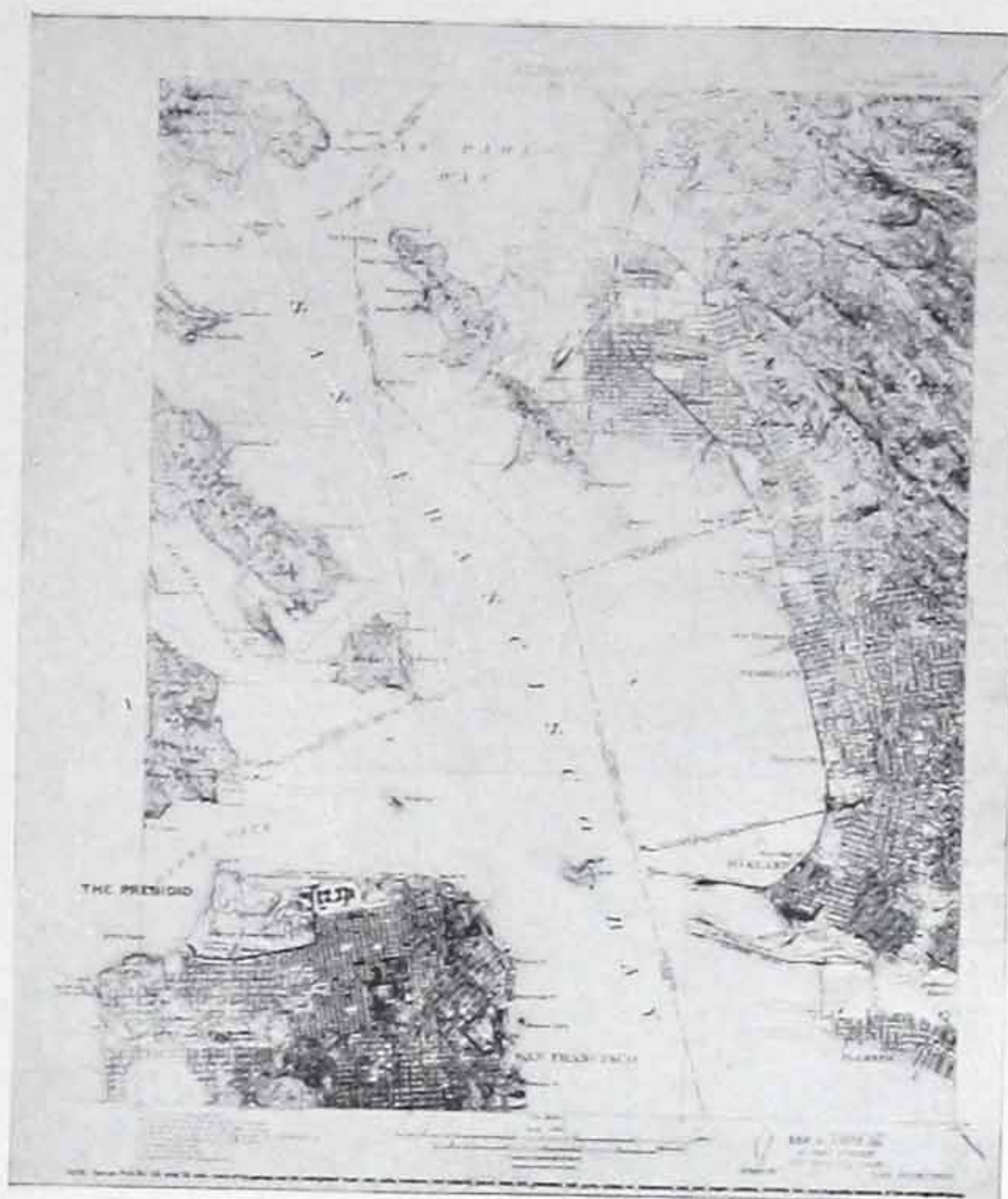
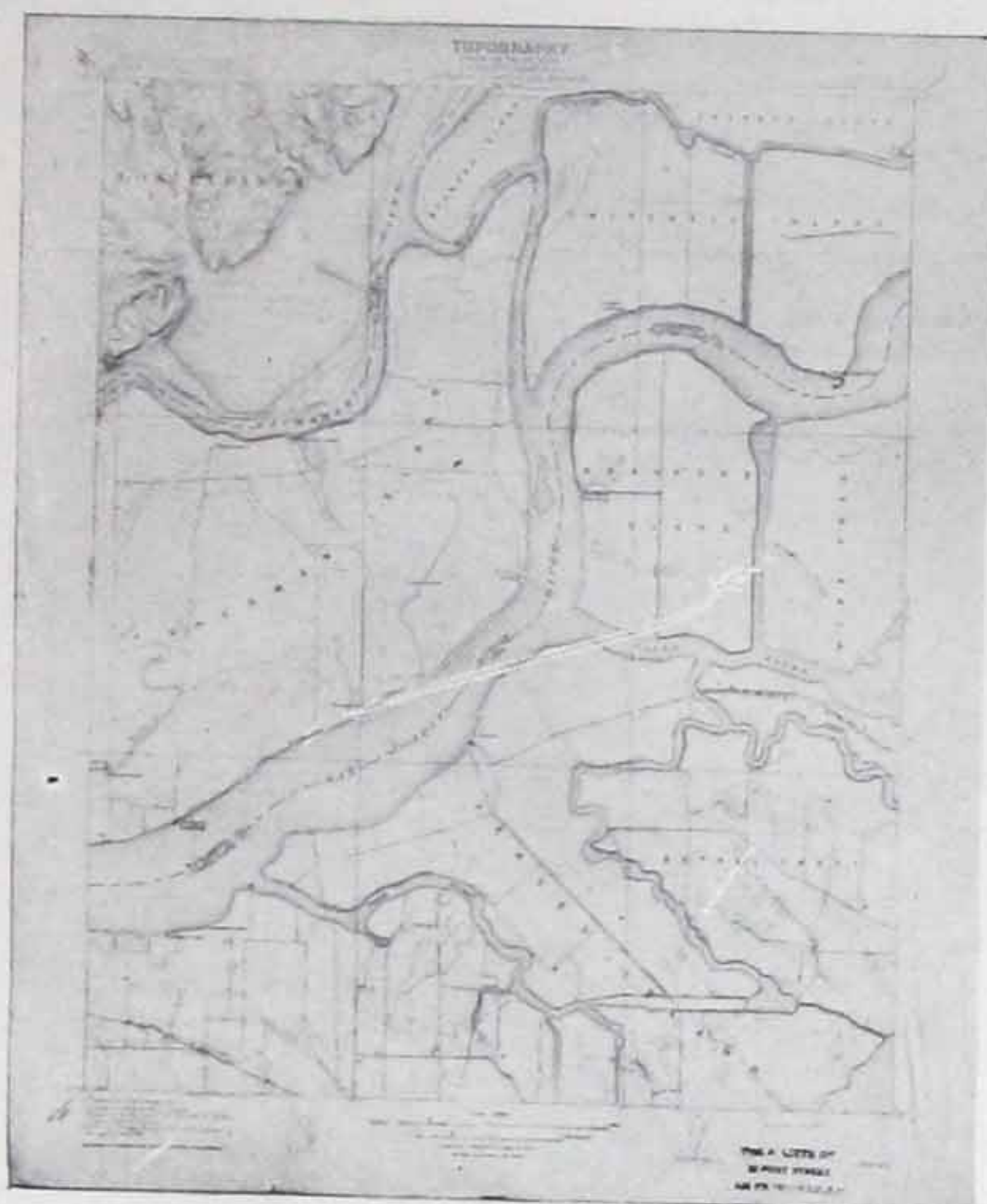
Illustrations actual size

No. 4214. Ox Hair Brushes, seamless copper ferrules, short polished handle, selected ox hair, for show card writing and fine painting.

Width—Inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Each								

SEE PRICE LIST IN BACK OF CATALOG

TOPOGRAPHIC MAPS



- No. 5000.** We carry the full line of Topographic Maps published by the United States Geological Survey for the States of California and Nevada, also Alaska. Each.....
Guide or Index Sheets sent on application.

SPECIAL MAPS PUBLISHED BY THE U. S. GEOLOGICAL SURVEY

- No. 5010. Oil and gas fields of the State of California.** Map printed on the southwestern portion of the base map of California prepared by the Bureau of Public Roads of the Department of Agriculture. Distinctive colors and symbols show the productive oil and gas fields, the main oil pipe lines, and the oil refineries in the State. Size, 44 by 49 inches. Scale, 1:506,880, or 8 miles to 1 inch.....
- No. 5012. Bakersfield, Cal.** This map shows part of Kern County. Limiting parallels, $35^{\circ} 22' 30''$ and $35^{\circ} 37' 30''$. Limiting meridians, $118^{\circ} 52' 30''$ and $119^{\circ} 07' 30''$. Size, $16\frac{1}{2}$ by 20 inches. Scale, 1:62,500, or about 1 mile to 1 inch. Contour interval, 20 feet.....
- No. 5014. Kern River Oil Field, Cal.** (Revised edition of Oil Center Special map). This map is printed in 2 sheets (north and south). North sheet, limiting parallels, $35^{\circ} 27' 30''$ and $35^{\circ} 30'$; limiting meridians, $118^{\circ} 56'$ and $119^{\circ} 02'$. South sheet limiting parallels, $35^{\circ} 25'$ and $35^{\circ} 27' 30''$; limiting meridians, $118^{\circ} 56'$ and $119^{\circ} 02'$. Size of each sheet, 20 by 33 inches. Scale 1:12,000, or 1,000 feet to 1 inch. Contour interval, 20 feet. Price of each sheet.....
- No. 5015. Lassen Volcanic National Park, Calif.** This map shows the Lassen Volcanic National Park. Limiting parallels, $40^{\circ} 25'$ and $40^{\circ} 35'$. Limiting meridians, $121^{\circ} 15'$ and $121^{\circ} 35'$. Size, 21 by 23 inches. Scale, 1:48,000, or 4,000 feet to 1 inch. Contour interval, 50 feet.....
- No. 5017. Naval Petroleum Reserve No. 1 (Elk Hills oil field), Calif.** This map shows the Elk Hills oil field in Tps. 30 and 31S., Rs. 23, 24, and 25E., Mount Diablo base and meridian. Size, 20 by 37 inches. Scale, 1:31,680, or one-half mile to 1 inch. Contour interval, 20 feet.....

SEE PRICE LIST IN BACK OF CATALOG

TOPOGRAPHIC MAPS

- No. 5018. Point Conception Sheet (North I 10) of International Map of the World.** This sheet is a ten-color lithograph representing the California coast adjacent to Point Conception. The altitudes of the land and the depths of the ocean are shown by contour lines and tints. Limiting parallels, 32° and 36° . Limiting meridians, 120° and 126° . Size 24 by 27 inches. Scale, 1:1,000,000, or, 15.78 miles to 1 inch.....
- No. 5020. Sacramento Valley, Cal.** This is a topographic map of the Sacramento Valley from Red Bluff to Suisun Bay. Limiting parallels, 38° and $40^{\circ} 15'$. Limiting meridians, 121° and $122^{\circ} 15'$. Size, 21 by 43 inches. Scale, 1:250,000, or about 4 miles to 1 inch. Contour interval, 25 feet.....
- No. 5021. Salton Sea and vicinity, Calif.** This map shows the Salton Sea and vicinity. Limiting parallels, $33^{\circ} 5'$ and $33^{\circ} 35'$. Limiting meridians, $115^{\circ} 32'$ and $116^{\circ} 7'$. Size, 40 by 40 inches. Scale, 1:62,500, or about 1 mile to 1 inch. Contour interval, 10 feet.....
- No. 5023. Sequoia and General Grant National Parks, Calif.** This map is composed of the Tehipite map and parts of the Kaweah, Mount Whitney, and Olancha maps, combined and printed as a single map. The boundaries of the parks are shown. Limiting parallels, $36^{\circ} 15'$ and 37° . Limiting meridians 118° and 119° . Size, 29 by 32 inches. Scale, 1:125 000, or about 2 miles to 1 inch. Contour interval, 100 feet.....
- No. 5024. San Francisco Bay Sheet (North J 10) of International Map of the World.** This sheet is a twelve-color lithograph representing San Francisco Bay and part of California and the Pacific Ocean adjacent to it. The altitudes of the land and the depths of the ocean are shown by contour lines and tints. Limiting parallels, 36° and 40° . Limiting meridians, 120° and 126° . Size, 24 by 25 inches. Scale, 1:1,000,000, or 15.78 miles to 1 inch.....
- No. 5026. Southern California.** This map is printed in 3 sheets. Sheet 1, limiting parallels, $33^{\circ} 30'$ and $34^{\circ} 30'$; limiting meridians, $116^{\circ} 30'$ and $118^{\circ} 30'$. Size, 20 by 33 inches. Sheet 2, limiting parallels, $32^{\circ} 30'$ and $33^{\circ} 30'$; limiting meridians, $116^{\circ} 30'$ and $117^{\circ} 45'$. Size, 20 by 22 inches. Sheet 3, limiting parallels, 34° and 35° ; limiting meridians, $118^{\circ} 30'$ and $120^{\circ} 45'$. Size, 22 by 36 inches. Scale of each sheet, 1:250,000, or about 8 miles to 1 inch. Contour interval, 250 feet. Price of each sheet.....
- No. 5028. Yosemite National Park, Cal.** The park limits established by the various acts of Congress are shown in colors. Limiting parallels, $37^{\circ} 30'$ and $38^{\circ} 15' 39''$. Limiting meridians, 119° and 120° . Size, 29 by 31 inches. Scale, 1:125,000, or about 2 miles to 1 inch. Contour interval, 100 feet.....
- No. 5030. Yosemite Valley, Cal.** Limiting parallels, $37^{\circ} 42'$ and $37^{\circ} 47' 05''$. Limiting meridians, $119^{\circ} 29' 11''$ and $119^{\circ} 43' 40''$. Size, 19 by 38 inches. Scale, 1:24,000, or 2,000 feet to 1 inch. Contour intervals, 50 feet...

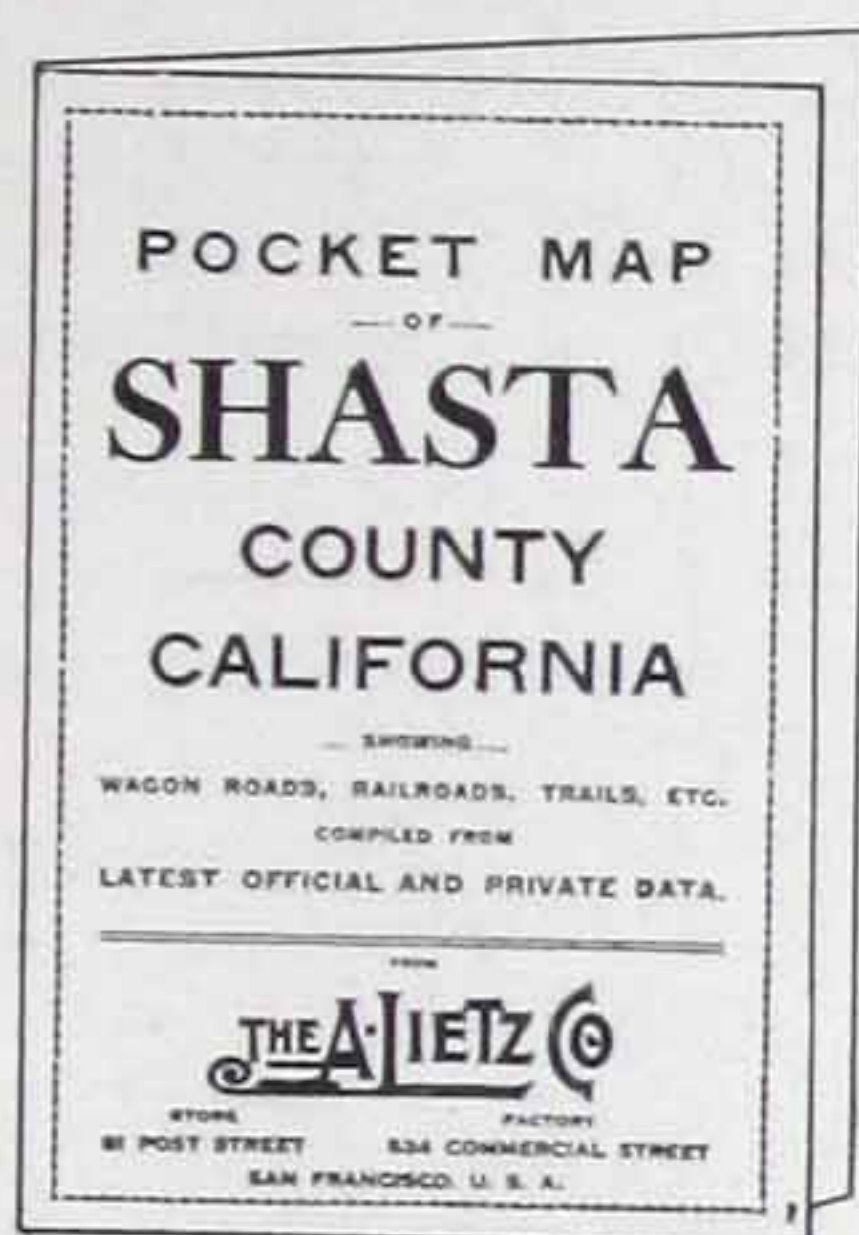
SHEETS OF CONVENTIONAL SIGNS AND LETTERING

- No. 5040. Sheet of standard symbols.** Shows symbols and abbreviations adopted by the Board of Surveys and Maps of the United States Government, for use on Government maps; printed in five colors. Size, 18 by 30 inches.....

SEE PRICE LIST IN BACK OF CATALOG

MAPS OF THE UNITED STATES

- No. 5052.** A wall map, 49 by 76 inches, in two sheets, on a scale of 40 miles to 1 inch, approximately, either with or without contours.
- No. 5054.** A wall map, 40 by 62 inches, on a scale of 50 miles to 1 inch, on which is indicated by depth of brown and blue colors the relative heights of the land and the depths of the sea. The position of the principal cities and the boundaries of the states are shown.
- No. 5056.** A map, 18 by 28 inches, on a scale of 110 miles to 1 inch, either with or without contours.
- No. 5058.** A relief or hypsometric map, same size, scale as next above; elevations indicated by colors.
- No. 5060.** A base map, 11 by 16 inches, on a scale of 190 miles to 1 inch.
- No. 5062.** A base map, 8½ by 12 inches, on a scale of 260 miles to 1 inch.



POCKET STATE MAPS

- No. 5070.** Pocket State Maps containing Commercial Index, giving towns, counties, populations and important features. .
(Specify name of state when ordering.)

CALIFORNIA COUNTY MAPS

- No. 5075.** California County Maps, showing roads, trails, sections, boundaries, containing latest corrections and revisions.
(Specify name of county when ordering.)

COAST CHARTS AND BOOKS

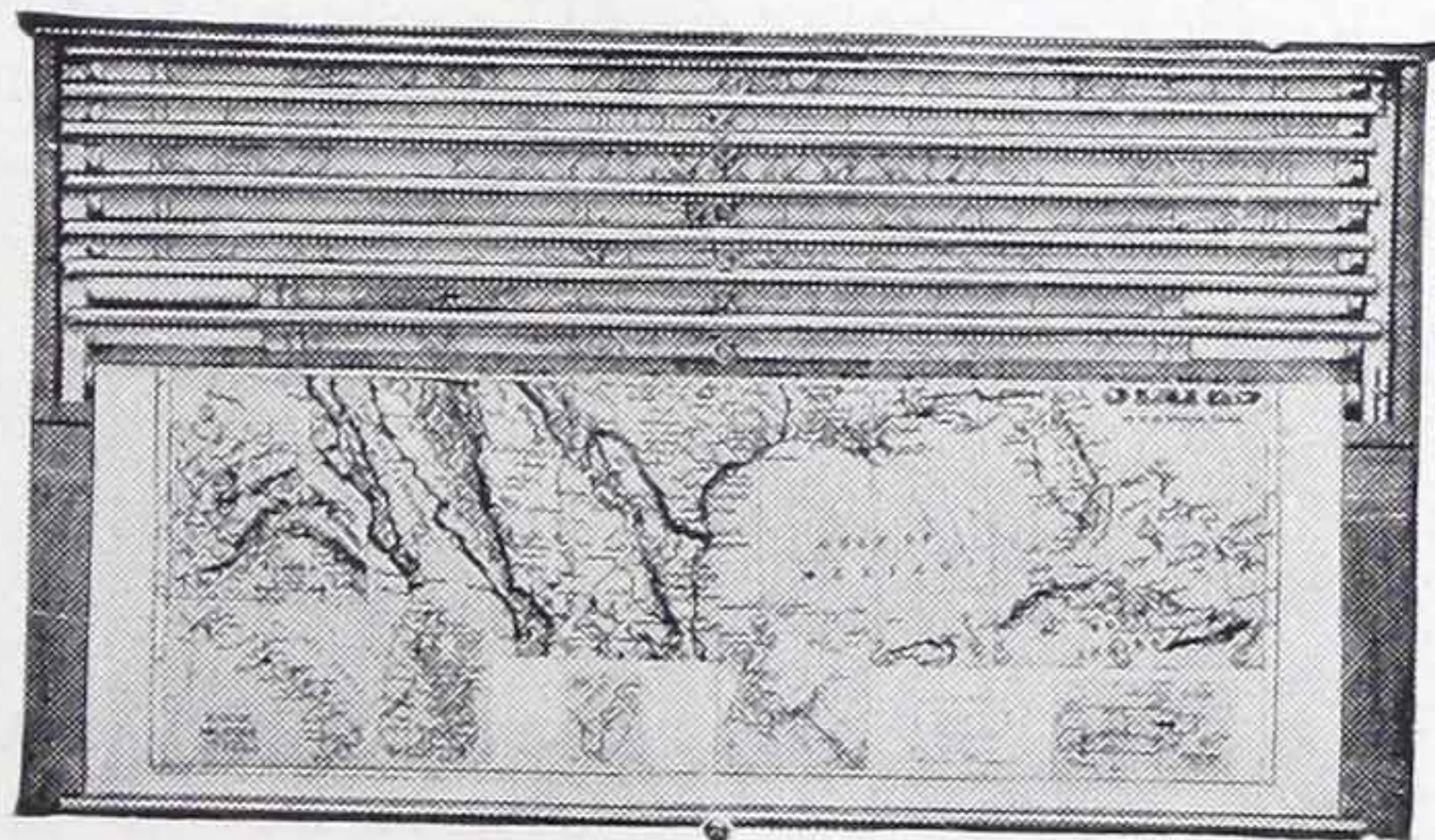
We carry in stock a full line of charts and publications of the U. S. Coast and Geodetic Survey and the U. S. Hydrographic Office.

Much valuable information of use to the geologist and engineer can be obtained from these records.

Write us if interested.

WALL MAP RACKS

Made to Order.



No. 5080

We cheerfully give estimates on Map Racks. State number of maps rack is to hold and sizes of same, also if rack is desired in oak, mahogany or shellacked spruce.

SEE PRICE LIST IN BACK OF CATALOG

SCIENTIFIC BOOKS



The books listed are the latest editions and are offered at publisher's prices. Postage extra. The prices are subject to change without notice in accordance with changes made by publishers. Books not listed will be obtained at prevailing prices.

As the publishers will not permit us to exchange or return books, we cannot send them on approval nor accept their return.

ARCHITECTURE

		Code Word
No. 6000.	HOOL & JOHNSON—Handbook of Building Construction.....	ADAGE
No. 6002.	KIDDER & PARKER—Architects and Builders....	ADAGIO
No. 6004.	RADFORD—Architectural Details.....	ADAM
No. 6006.	WALKER—Building Estimators' Reference Book..	ADAMANT

CONCRETE

No. 6010.	HOOL & JOHNSON—Concrete Engineers' Handbook.....	ADDER
No. 6012A.	HOOL—Reinforced Concrete Construction, Vol. I. (Fundamental Principles).....	ADDICT
No. 6012B.	HOOL—Reinforced Concrete Construction, Vol. II. (Retaining Walls & Buildings).....	ADDLE
No. 6012C.	HOOL—Reinforced Concrete Construction, Vol. III. (Bridges & Culverts).....	ADDUCE
No. 6014.	HOOL & WHITNEY—Concrete Designers' Manual.	ADDUCTOR
No. 6016A.	TAYLOR - THOMPSON - SMULSKI—Concrete—Plain and Reinforced. Volume I (Theory and Design of Concrete and Reinforced Structure).....	ADDUFT
No. 6016B.	TAYLOR - THOMPSON - SMULSKI—Concrete—Plain and Reinforced. Volume II (Theory and Design of Beams, Frames and Arches).....	ADDUKE

COSTS

No. 6020.	GILLETTE—Handbook of Cost Data.....	ADENOID
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DRAWING

No. 6026.	FRENCH & SVENSEN—Mechanical Drawing for High Schools.....	ADEPTIN
No. 6028.	KEPLER—Mechanical Drafting Handbook.....	ADERTO

ELECTRICAL

No. 6030.	FOSTER—Electrical Engineers' Pocketbook.....	ADIT
No. 6032.	PENDER—Handbook for Electrical Engineers....	ADJURER

SEE PRICE LIST IN BACK OF CATALOG

ENGINEERING HANDBOOKS

		Code Word
No. 6042.	ALLEN—Field & Office Tables.....	ADMONE
No. 6044.	ALLEN—Combined Book, Curves and Earthwork and Field and Office Tables.....	ADNATE
No. 6048.	HODGMAN—Surveyors' Tables.....	ADORN
No. 6050.	HOSMER—Azimuth.....	ADOWN
No. 6052.	MERRIMAN—Civil Engineers' Pocketbook.....	ADRIFT
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SAN FRANCISCO, U. S. A.

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CCA



Price List

Applying to



GENERAL CATALOG

17th EDITION



Prices are subject to change
without notice

THE A. LIETZ COMPANY

Established 1882

Main Office and Factory

OAKLAND

SAN FRANCISCO

LOS ANGELES

TELEGRAPHIC CODE

Our customers have found it convenient and economical to use the Telegraphic Code Words which are found opposite the items in our catalog. To further facilitate the use of telegrams when placing orders or requesting information we offer the following:

	Code Word
Ship me or us by next boat.....	ASTER
Ship me or us today via Parcel Post.....	CARNATION
Ship me or us today via Express Prepaid.....	IRIS
Ship me or us today via Express Collect.....	DAISY
Ship Prepaid Express direct to.....	MARIGOLD
Ship Express Collect direct to.....	GLADIOLUS
Ship Parcel Post direct to.....	POPPY
Ship me or us by Railroad Freight.....	HAREBELL
Ship by Railroad Freight direct to.....	CROCUS
Wire Quotation on.....	PANSY
Wire Delivery on.....	TULIP
Wire Quotation and Delivery on.....	LILAC
When may we expect Delivery on.....	ROSE
Ship C. O. D. Express to.....	JASMINE
Ship C. O. D. Parcel Post to.....	GERANIUM
Send by Air Mail to.....	LILY
Send me or us by Air Mail.....	GARDENIA

SURVEYING INSTRUMENTS

TRANSITS

	Each		Each		Each
2	\$355.00	9	\$410.50	25D	\$.75
3	404.50	11E	420.70	25E	.35
4	420.70	12	410.50	25F	.45
5	509.00	Accessories		25G	1.50
5C	539.00				
5E	420.70	16	\$100.00	LEVELS	
5F	560.00	17	100.00		
5G	900.00	17D	11.00	19	\$225.00
6	410.00	25A	1.00	19G	350.00
8	400.00	25B	.10	20T	210.00
		25C	.10	20G	900.00

FEATURES FOR SURVEYING INSTRUMENTS

For which additional charge is made when not included in the specifications.

	Code Word	Each
Horizontal verniers reading to 30 seconds	CULLYISM	\$15.00
Horizontal verniers reading to 20 seconds	CULMINATE	30.00
Horizontal verniers reading to 10 seconds	CURABLE	45.00
Stadia hairs fixed	CUPOLA	4.50
Disappearing stadia hairs	CUPRIC	6.50
Variation ring to compass	CULPRIT	15.00
Arrangement for offsetting right angles	CULTIVATE	7.50
Gradiometer attachment to vertical motion with movable head (see page 15)	CULPABLE	10.00
Constructed with three leveling screws instead of four	CULVERIN	20.00
Three leveling screws shifting center	CUMBER	10.00
Striding level to axis of telescope	CULTRATED	30.00
Beaman Stadia Arc for Alidade	DIAMOND	15.00
Stadia Circle for Transit	CULTAG	15.00
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Reflector for illuminating cross hairs	CUNEIFORM	6.00
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Mirror to control bubble from the end	CUPID	15.00
Agate-fitted wyres	CUPIDITY	35.00
Trough compass for alidade	DROUGHT	15.00
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PARTS FOR SURVEYING INSTRUMENTS

For Transit		
Piece No.		Each
2½.	Sunshade	\$ 1.00
6.	Cross Hair Frame.....	1.00
8.	Pinion Head	3.50
15.	Axis Clamp complete.....	12.50
17.	Tangent Screw	1.35
19.	Standard Level Case	2.00
21.	Vertical Circle Guard	6.00
25.	Plate Level Case	2.00
26.	Plate Tangent Screw	1.35
30.	Vernier Shade Bracket .....	.45
32.	Compass Glass Bezel	5.00
34.	Compass Needle	6.00
37.	Plate Clamp complete	7.50
40.	Lower Clamp complete	12.50
42.	Leveling Screws	1.75
43.	Leveling Screw Cups25
46.	Base Plate	5.00
47.	Spindle Nut30
48.	Plumb bob Cap75
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87.	Tangent Spring25
88.	Chain for Plumb bob35
89.	Vernier Cover Glasses	1.00
90.	Dust Cap for Telescope	1.50
New Diaphragm with Cross Hairs only (design No. 1)		7.50
New Diaphragm with Cross and Stadia Hairs (design No. 2)		12.50
New Diaphragm with Hairs, Special Design		15.00
New mahogany box with wooden fittings and strap complete for Transits Type 4 and 9		25.00
New mahogany box with wooden fittings and strap complete for Transits Type 12		25.00
Extra key for boxes .....		.25
New strap for boxes		1.50
New bumpers for boxes .....		.10
New shipping boxes with carrying rope for transits and levels		1.50

PARTS FOR SURVEYING INSTRUMENTS

For Levels		
Piece No.		Each
2½.	Sunshade	\$ 1.00
6.	Cross Hair Frame	1.00
9.	Tel. Level Housing	2.50
9B.	Tel. Level End Fast Screw....	.20
10.	Tel. Level Brackets	2.00
11.	Tel. Level Adjusting Nuts....	.40
20A.	Lower Nuts to Standard	1.00
20B.	Upper Nuts to Standard	1.00
21A.	Cap .....	.30
21B.	Plunger .....	.20
21C.	Plunger Spring .....	.20
21D.	Lock Pins .....	.40
21E.	Hinge Pins (not shown) .....	.20
21F.	Stop Pin to Telescope .....	.20
26.	Tangent Screw	1.50
40.	Lower Clamp	12.50
42.	Leveling Screw	1.75
43.	Leveling Screw Cups .....	.25
44.	Ball	1.00
46.	Baseplate	5.00
47.	Spindle Nut .....	.30
48.	Bottom Cap .....	.40
51C.	Plunger .....	.40
56.	Plunger Cap .....	.40
78.	Cross Hair Frame Screw .....	.25
80.	Cross Hair Frame Washer....	.20
82.	Plate Clamp Screw	1.35
84.	Pinion Head Screw .....	.20
87.	Spring (not shown) .....	.25
90.	Dust Cap	1.50
130.	Eye Piece Focusing Screw....	.20
New mahogany box with wooden fittings and strap complete for Levels Type 19 and 20T		25.00

PRICES OF LEVEL VIALS ONLY, WITHOUT HOUSING

	Each
Level Vials for Telescopes of Transits and Levels. Per inch of length (unmounted)	\$ 1.50
Level Vials for Plate and Standard of Transits (unmounted)	1.00
Circular Level Vial (as furnished with our Hydrographic Y Level and Alidades)	4.50
Plain Level Vials, not graduated, 1 to 4 inches long .....	.60
Plain Level Vials, not graduated, 4½ to 6 inches long.....	1.25

SURVEYORS' UMBRELLAS

	Each
28	\$16.50

ALIDADES AND PLANE TABLES

	Each		Each		Each
30	\$275.00	34C	\$45.00	34M	\$1.25
31	218.00	34CE	55.00	34N	2.50
32	208.00	34F	9.00	34MM	1.00
32LC	218.00	34FF	8.00	34NN	2.00
33	225.00	34H	6.00	34½ CE	50.00
33A	225.00	34J	7.50	34½ CEC	14.00
34B	75.00	34JJ	6.75	35A	10.00
		34K	6.50	35B	4.00
		34L	9.50	35C	4.00

FEATURES FOR ALIDADES AND PLANE TABLES

	Code Word	Each
Prism to eye-piece	CUMBERSOME	\$12.00
Gradiometer attachment to vertical motion with movable head	CULPABLE	10.00
Level attached to vernier arm for control of zero on vernier	DIAGNOSE	15.00
Trough compass with 3½ inch needle mounted on blade	DROUGHT	15.00
Quarter hair in upper field	DIALECT	No Chge.
Parallel straightedge attachment to blade	DIALOGUE	25.00
Beaman stadia arc	DIAMOND	15.00
Inverting eye-piece (made to order only)	CUTWATER	No Chge.
Graduation of blade to inches and 50th	DIABAN	15.00
Graduation of blade special	DIANA	25.00
Extra high power eye-piece	DIATEX	25.00
Extra lowpower eye-piece	DIALOW	25.00

PARTS FOR ALIDADES AND PLANE TABLES

	Code Word	Each
Extra striding level complete	DIBBER	\$22.50
Extra circular spirit level for blade	DICKY	4.50
No. 35D. Wing nuts for Johnson head	DUBLING	.55
No. 35E. Leveling screws for tangent head	DUCAL	1.25
No. 35F. Screws for attaching board to tangent head	DUCKING	.40
No. 35G. Holding-down screw and socket for drawing board	DUCTILE	.40
No. 35H. Holding-down screw only	DUDEEN	.20
No. 034C. Extra straight leg for tripod (Johnson or tangent head)	DUENA	4.50
No. 039S. Extra Extension Leg for Tripod (Johnson Head)	DUFFER	8.00
No. 034½. Separate Lightweight Extension Leg for Johnson Head Tripod No. 34½ CE	DUFFAX	5.40

TRAVERSE TABLES

	Each		Each		Each
35½	\$13.50	38L	\$27.00	039Q	\$1.75
37A	12.00	39S	35.25	039R	.70
37B	22.50	39L	35.25	040	3.25
37C	16.50	40	15.00	042G	.60
37	39.75	038S	6.00	042H	.60
37X	50.00	038L	6.00	43S	9.15
037A	1.85	039S	8.00	43L	9.15
037B	5.40	039A	1.95	043A	1.35
		039B	1.90	043B	.90
		039C	1.75	043C	.90
		039D	.70	044C	.40
		039L	8.00	44A	18.50
		039M	1.95	44B	15.00
		039P	1.90		

TRIPODS AND PARTS

	Each
38S	\$27.00
38G	28.50

FARM AND BUILDERS' LEVELS

	Each
46	\$ 75.00
46C	89.50
47	25.00
432 Rod	5.00
48	105.00
48S	112.50

RHODES REDUCING ARC

	Each
50	\$125.00

SEXTANTS

	Each
55	\$145.00
56	104.00
57	17.50

MAGNIFIERS, READING GLASSES, etc.

	Each
65	\$.60
66	1.00
67	5.00
68	1.00
69	1.00
70	1.20
70A	1.50
70B	1.70
71	2.25
75	2.00
76	3.00
79C-7	3.75
79C-10	3.75
79C-14	3.75
79C-20	3.75
79H-7	7.50
79H-10	7.50
79H-14	7.50
79H-20	7.50
81	1.25
83	3.75
84	1.00
85	1.50
86	1.65
87	1.80
88	2.20
89	2.75
90	4.00
91	5.00
92	4.50
101	1.00
104	2.75
105	3.00
106	5.00
109	5.25
110A	7.50
110B	8.75

ANGLE PRISM

	Each
117	\$9.00

TALLYS, CRUISERS' PADS, SCRIBES

	Each
126A	\$2.60
126B	3.90
129	2.70
130	1.40

PEDOMETERS

	Each
132A	\$2.50
135	9.00
136	9.00

MINING AND SURVEYING COMPASSES

	Each
137	\$48.40
139	44.00
140LC	37.50

Accessories for Compasses

	Each
144A	\$ 7.50
144C	4.20
146	3.00
148	7.20

POCKET COMPASSES

	Each
152 Alum.	\$ 4.75
152A Alum.	4.75
153S Alum.	5.75
153SA Alum.	5.75
156 .....	.75
158	1.25
159	4.00
160	1.25
161	4.00
165	4.75
167	13.50
168	16.75

BRUNTON COMPASS AND ACCESSORIES

	Each
183	\$30.00
183A	30.00
185A	2.75
185B	3.30
185BB	8.50
185C	7.50
185D	6.00
185E .....	.25
185F	1.35
185G .....	.60
185H .....	.35
185I	3.00
185J	2.25
185K	3.75
185L	1.00

HAND LEVELS

	Each
188	\$32.50
189	9.00
190	7.25
190A	6.00
191	6.00
192	4.50
192A	3.50
195DS	19.50
195PD	19.50
198PD	21.00
198PT	21.00

Parts for Hand Levels

	Each
190LC	\$ 1.25
191LC	1.50
192LC	1.00
195LC	1.75
198LC	2.00
197A .....	.25
197B .....	.25
197C	1.20
197D	1.25
197E .....	.25

ANEROID BAROMETERS

	Each
200	\$45.00
200C	41.50
200D	45.00
200E	45.00
202C	27.50
202E	30.00
205	58.50
205A	58.50
205C	55.00
205D	58.50
205E	58.50
205F	61.00

Accessories for Aneroids

	Each
206	\$ 4.50
206A	5.50
206B	5.75
206D	4.50

ALTITUDE BAROMETERS

	Each
205 1/2 A	\$42.00
205 1/2 D	43.00

AUTO ALTIMETER

	Each
208 1/2	\$36.50

SURVEYING BAROMETERS

	Each
208AL	\$135.00
208ALB	129.00
208ALD	135.00
208ALF	141.00
211AL	118.00
211ALB	112.50
211ALD	125.00
213-A1	160.00
213-A2	140.00
213-A3	100.00

BRASS CASE BAROMETERS

	Each
220	\$ 9.50
221	10.50
222	15.00
223	25.00

WALL BAROMETERS

	Each
226	\$25.00
227	27.00
229	4.50

STORMOGUIDES

	Each
230	\$12.00
230HA	14.00
231	7.50
231HA	9.00
232	15.00
232HA	17.00

BAROGRAPHS, THERMOGRAPHS, etc.

	Each
240	\$115.50
242	60.00
244	60.00
248	170.50
249	100.00

Accessories for Recording Instruments

	Per Set
Chart No. 2	\$ 3.50
Chart No. 83	3.50
Chart No. 20	3.50
Chart No. 84	3.50
Chart No. 85	3.50
Chart No. 58	5.00

	Each
250A	\$ 1.25
250B	1.50
250C	.60
250D	1.00

HYGROMETERS AND HUMIDIGUIDES

	Each
252	\$ 5.50
253	5.00
254	3.50

SLING PSYCHROMETERS

	Each
256	\$15.00
257	18.00
256A	5.00
257A	5.00

MAXIMUM AND MINIMUM THERMOMETERS

	Each
265	\$24.00
266	8.00
267	8.00
268	8.00
279	7.00
280	3.00
281	4.50

THERMOMETERS

	Each
282	\$ 3.00
284	1.00
285	1.25
288	1.00
290	1.00
294	.65
295	.65
296	1.00
297	3.50

STEM THERMOMETERS

	Each
300A	\$ 1.60
300B	1.60
300C	1.70
300D	1.90
300E	2.50
301A	1.60
301B	1.70
301C	1.90
301D	2.10
305A	6.00
305B	6.00
305C	8.00
305D	7.00
305E	8.00
305F	10.00
305G	13.00
306A	6.00
306B	6.00
306C	7.00
306D	8.00
306E	10.00

	Each
306F	\$13.00
0305A	3.00
0305B	3.00
0305C	3.00
0305D	4.00
0305E	5.00
0305F	7.00
0305G	10.00
0306A	3.00
0306B	3.00
0306C	4.00
0306D	5.00
0306E	7.00
0306F	10.00

ASPHALT THERMOMETERS

	Each
310	\$ 8.00
311	11.00
312	4.00
0310	5.00
0311	8.00
0312	3.75

POCKET THERMOMETERS

	Each
315	\$ 2.00
316	2.70

RAIN GAUGES

	Each
320	\$ 12.50
321	3.50
320A	.50
321A	.40
322	124.00
323	137.00

Charts for Rain Recorders

	Per 100
358A	\$10.00
358AW	12.00
359A	10.00
359AW	12.00

ANEMOMETERS

	Each
332	\$ 97.00
334	89.00
334A	40.00
334B	125.50
334C	115.50

Accessories for Anemometers

	Each
335	\$ 4.50
335A	7.00

CURRENT METERS

	Each
347A Complete	\$137.50
347B Complete	142.50
348	90.00

Individual Rating Tables

	Each
FIRKILE	\$25.00
FIRKIPA	25.00
FIRKIN	45.00
FIRKITO	17.50

Accessories for Current Meters

	Each
346A per ft.	\$.15
346B—15 lbs.	7.50
30 lbs.	15.00
50 lbs.	25.00
75 lbs.	37.50
346E	.75
346J	2.00
346JJ	2.00
346K	5.00
346KK	.40
346L	.75
346M	1.50
346N	.35
346P	30.00
346PP	3.50
346R	2.00
346S	4.00
346SS	1.00
346T	4.50
346TT	7.50
346U	14.00
346V	7.50
346W	1.50

STOP WATCHES

	Each
350	\$38.50
351	18.00
351T	16.50
351A	23.50
353	35.00
353S	9.95

STREAM RECORD SHEETS

	Per 100
349	\$ 4.00
	Each
349A	\$ 2.00

HOOKE GAUGE

	Each
355	\$25.00

WATER STAGE RECORDERS

	Each
356-8D	\$ 67.50
356-4D	67.50
356-2D	67.50

	Each
356-24H	\$ 67.50
356-12H	67.50
357-4D	79.50
357-2D	79.50
357-24H	79.50
357-12H	79.50
356A-8D	77.50
356A-4D	77.50
356A-2D	77.50
356A-24H	77.50
356A-12H	77.50
357A-4D	89.50
357A-2D	89.50
357A-24H	89.50
357A-12H	89.50
360	65.00
360A	75.00
360B	75.00
360C	75.00
362	95.00
362A	105.00
362B	105.00
362C	105.00

TIDE GAUGE PAPER

	Each
368	\$ 1.25

Accessories for Water Stage Recorders

	Per 100
358	\$10.00
358W	12.00
358A	10.00
358AW	12.00
359	10.00
359W	12.00
359A	10.00
359AW	12.00
365A	5.50
365AW	6.50
365C	5.50
365CW	6.50

	Each
365E— 7"	\$ 6.00
12"	10.00
14"	12.50
16"	15.00

365F	1.10
358G	.60
365G	.60
358H	.50
365H	.35
358I	2.50
358J	40.00
358K	52.00
361	45.00
0361	32.50
365K	1.75
358M—Per Yd.	.15
365L	.25
358L	.25

PORCELAIN GAUGE SCALES

	Each
370A	\$.75
370B	1.75
370C	3.35
370D	4.75

BINOCULARS

	Each
374A	\$72.00
374B	86.00
374C	82.00
374D	93.50

Field Glass Clamp

	Each
385	\$ 7.50
185D	6.00

FIELD GLASSES AND TELESCOPES

	Each
394	\$25.00
395	16.00
396	17.50
397	3.75
398A	9.75
398B	12.00
398C	21.50
398D	37.50
398E	49.50
399	10.00

FLEXIBLE RODS

	Each
400	\$ 6.00
401	6.00
402	6.00
406	1.85
406A	2.50
406B	3.10
408	1.85

LEVELING RODS

	Each
410	\$23.50
410M	25.00
0410	19.00
411	21.00
411M	22.50
0411	16.50
412	19.00
412M	20.50
0412	14.50
420	23.50
420M	25.00
0420	19.00
421	19.50
421M	21.00
0421	15.00

Leveling Rods (Con't.)

	Each
422	\$18.00
422M	19.50
0422	13.50
423	17.00
423M	18.50
0423	12.50
425	16.00
425M	17.50
0425	11.50
428	19.50
428M	21.00
0428	16.00

ARCHITECTS RODS

	Each
430	\$11.00
431	11.00
432	5.00

Extra Targets

	Each
437	\$ 4.50
437M	6.00
439	3.00
440	.50

SAN FRANCISCO 3-PLY RODS

	Each
444A	\$16.50
444B	18.50
444C	21.50

Canvas Covers for Rods

441A	\$ 4.00
441B	4.00
441C	4.00
442A	4.00
442B	4.00
445A	3.75
445B	4.00
445C	4.00

ROD LEVELS

	Each
449	\$ 4.50

STADIA RODS

	Each
450	\$17.50
451	21.00
454	17.50
455	21.00
460	11.50
461	13.50
462	16.00

RANGING POLES

	Each
465A	\$ 3.60
465B	4.45
466A	3.60

	Each
466B	\$ 4.15
466C	5.15
467A	4.45
467B	5.00
467C	5.90
468	7.40
469	6.20

CHICAGO RODS

	Each
470A	\$18.50
470B	24.70
471A	18.50
471B	24.70
472A	3.70
472B	3.70
472-2S	8.65

PLUMB BOBS

	Each
474	\$ 1.35
475	1.50
476	1.70
477	1.95
478	2.10
479	2.40
480	2.80
481	4.00
482	5.40
484A	.30
484C	.30

Plumb Cord

	Per Yd.
485A	\$.04
485B	.04
485C	.04
486	.06

Plumb Bob Target

	Each
490	\$ 1.00

Iron Plumb Bobs

	Each
515	\$.60

Plumb Bob Scabbards

	Each
516A	\$.80
516B	.80
516C	.80
516D	.80
516E	.95
516F	.95
516G	1.10
516H	1.10
516K	1.75

Plummet Adjustor

	Each
520	\$.90

BUSH KNIVES, AXES, etc.

	Each
521	\$ 3.00
521A	5.00
523	3.75
526	1.75
526A	2.50
527	2.50

STAKE TACKS AND SPADS

	Each
528B	\$.20
528C	.45
531A	1.00
	Per 1000
531B	\$18.00
	Each
532A	\$.80
	Per 1000
532B	\$14.00

SURVEYORS ARROWS

	Per Set
534	\$ 2.70
535	3.10
536	1.70
537	1.90
538	3.00
539	2.40
	Each
545	\$.50
548	4.25
549	3.75
	Per Yd.
550	\$.25
551	.25

PIONEER CHAIN TAPES

	Each
5100	\$12.30
05100	8.20
5200	19.20
05200	15.20
5300	29.10
05300	22.20
Thongs only, pr.	.90

Reels for Pioneer Tapes

	Each
50—100 feet	\$ 4.10
150—200 feet	5.00
300 feet	7.40

Geological Survey Reels

	Each
81	\$24.20

CANYON CHAIN TAPES

	Each
4100	\$20.40
04100	8.20
4200	26.60
04200	15.20
4300	36.00
04300	22.20
4500	51.00
04500	36.20

Reels for Canyon Tapes

	Each
100—200 feet	\$12.20
300—500 feet	14.80

TOPOGRAPHIC TRAILER TAPES

	Each
5165T	\$20.70
05165T	15.70

WESTERN ENGINEERS' TAPES

	Each
1576D-XX	\$18.40
1276D-XX	20.40
1376D-XX	24.50
01276D-XX	15.00

Reels for Western Tapes

	Each
for 1576D-XX	\$ 4.10
for 1276D-XX	6.00
for 1376D-XX	9.50

MICHIGAN CHAIN TAPES

	Each
3050	\$10.30
03050	6.20
3100	12.30
03100	8.20
3066	10.70
03066	6.60
3200	19.20
03200	15.20
3300	29.10
03300	22.20

Reels for Michigan Tapes

	Each
50—100 feet	\$ 4.10
200 feet	7.20
300 feet	9.30
500 feet	11.30
Shoulders	pr. .80

HI-WAY DRAG TAPES

	Each
9050	\$13.00
09050	8.50
9100	15.80
09100	11.30
9200	28.80
09200	20.30
9300	41.10
09300	29.30

Reels for Hi-Way Tapes

	Each
50—100 feet	\$ 4.50
200 feet	9.10
300 feet	11.80

CLAMP HANDLES, SWIVEL HOOKS, THONGS

	Each
584	\$ 3.10
585 .....	.25
586	pr. .90

SPECIAL REELS

	Each
Cripple Creek Reel	\$40.70
Staff	6.20
1914—100 ft.	25.30
1914—200-300 ft. ..	28.60
1914—500 ft.	29.70

LOCK HANDLE FRAME TAPES

	Each
1273X	\$ 9.70
1273DX	9.70
1276X	16.50
1276DX	16.50
1283	8.40
1283D	8.40
1286	14.30
1286D	14.30

OIL MEASUREMENT TAPES

	Each
1283WB	\$11.00
1290S with 590	12.70
1291S with 590	13.60
1293S with 590	15.60
1294S with 590	17.60
01290S for 590	5.40
01291S for 590	6.20
01293S for 590	7.20
01294S for 590	9.50

PLUMB BOBS FOR STEEL TAPES

	Each
588	\$ 2.60
589	2.10
590	3.10
590G	4.10

ATTACHMENTS FOR ENGINEERS' TAPES

	Each
650	pr. \$ 1.10

Tension Handles

	Each
626	\$ 6.20
627	7.20
628	8.00
629	10.00

Tape Level

	Each
635	\$ 3.50
636	10.00

STAINLESS STEEL TAPES

	Each
S233	\$14.70
S233D	14.70
S236	27.20
S236D	27.20
S260	7.30
S260D	7.30
S263	10.70
S263D	10.70
S265	14.80
S265D	14.80
S266	19.50
S266D	19.50

ENGINEERS' PATTERN TAPES

	Each
233X	\$ 9.70
233DX	9.70
235X	13.80
235DX	13.80
236X	17.20
236DX	17.20
1373X	12.90
1373DX	12.90
1376X	22.00
1376DX	22.00

RELIABLE STEEL TAPES

	Each
200	\$ 6.10
200D	6.10
203	9.50
203D	9.50
205	13.80
205D	13.80
206	16.50
206D	16.50

HOOE-RING ON TAPES

	Each
Code Word	
GAYHOO	\$.20

Tape Hooks

	Each
654	\$.80
655 .....	.80

CHALLENGE STEEL TAPES

	Each
260	\$ 5.40
260D	5.40
263	6.60
263D	6.60
265	8.60
265D	8.60
266	11.30
266D	11.30
263DOB	7.70
263MOB	7.70
266DOB	13.50
266MOB	13.50
1260	5.20
1260D	5.20
1263	6.30
1263D	6.30
1263DOB	7.50
1263MOB	7.50

TREE AND DIAMETER TAPES

	Each
261TP	\$ 9.90
263TP	12.50

	Each
120TP	\$ 5.00
261P	7.70
263P	9.30

BANNER STEEL TAPES

	Each
550	\$ 4.20
550D	4.20
553	5.20
553D	5.20
556	8.60
556D	8.60

UNIVERSAL STEEL TAPES

	Each
540	\$ 3.10
543	3.50
546	5.90

REPAIRS TO STEEL TAPES

	Each
A	\$.50
B	.15
C	.45
D	.15
E	.75
F	.35
G	.15

POCKET SPRING TAPES

	Each
143	\$.95
145	1.25
146	1.35
148	1.90
143D	1.00
145D	1.35
146D	1.55
148D	2.15
143EM	1.00
145EM	1.35
146EM	1.55
148EM	2.15
391	1.35
392	1.35
393	1.35

STEEL TAPE REFILLS

$\frac{1}{4}$ Inch Wide, Light Weight "Junior" Refills

For "Reliable Jr." and "Challenge Jr."

Length, feet	25	50
Length, meters		15
Marked one side	Each \$3.60	\$4.50
Marked both sides	Each	6.00

$\frac{1}{4}$ by .015 Inch Engineers "Extra Weight" Refills. (With detachable rings)

For Series 233-X, 1373-X and 1273-X, also D and ME.

Length, feet	50	75	100
Length, meters	15		30
Marked one side	Each \$7.50	\$11.30	\$14.00
Marked both sides	Each 9.30		17.80

$\frac{3}{8}$ Inch Wide Steel Tape Refills

For Series 200 "Reliable," 260 "Challenge," 1283 Frame Tapes, also D and ME.

Length, feet	25	33	50	75	100	150	200
Length, meters	7 $\frac{1}{2}$	10	15	22	30		
Marked one side	Each \$3.60	\$3.90	\$4.50	\$6.00	\$ 7.80	\$13.50	\$18.00
Marked both sides	Each 4.40	4.80	6.00	8.30	10.80		

$\frac{3}{8}$ Inch Wide STAINLESS STEEL Tape Refills

For Series S-260, also D and ME, and same stainless tapes of other series.

Length, feet	25	50	75	100
Length, meters	7 $\frac{1}{2}$	15		30
Marked one side	Each \$6.10	\$ 9.50	\$13.50	\$17.80
Marked both sides	Each 6.90	11.00		20.80

METALLIC TAPES

	Each
500	\$ 3.90
500D	3.90
503	5.50
503D	5.50
505	7.00
505D	7.00
506	8.70
506D	8.70
503DL	5.90
503ME	5.90
505 1/2 ME	8.10
506DL	9.40
506ME	9.40
0500	1.60
0500D	1.60
0503	2.80
0503D	2.80
0505	3.70
0505D	3.70
0506	5.30
0506D	5.30
0503M	3.10
0505 1/2 M	4.80
0506M	5.90
0500DL	1.80
0503DL	3.10
0503ME	3.10
0505DL	4.10
0505 1/2 ME	4.80
0506DL	4.90
0506ME	5.90
603	7.40
603D	7.40
606	10.60
606D	10.60
660	4.10
660D	4.10
663	5.10
663D	5.10

0660	Each \$ 1.60
0660D	1.60
0663	2.60
0663D	2.60

STERLING LINEN TAPES

	Each
400	\$ 3.80
403	5.00
406	7.50
0400	1.50
0403	2.60
0406	4.80

TAPE REPAIR OUTFITS

	Each
675	\$ 6.95
675A	1.95
675B	.60
675C	.50
675D	.50
675DD	.60
675E	.25
675F	.10
675G	.35
680	19.40
685	.70
685A	.25
686	.90
690	.75

FIELD BOOKS

	Doz.	Each
760	\$15.00	\$ 1.30
760F	11.10	1.00
760S	3.00	.30
762	13.50	1.20

	Doz.	Each
763	\$15.00	\$ 1.30
763F	11.10	1.00
764	15.00	1.30
764F	11.10	1.00
764S	3.00	.30
766	15.00	1.30
768	21.60	1.90
770	12.90	1.15
772	15.00	1.30
772F	10.50	.95
774	18.30	1.60
774F	14.25	1.25
777	15.00	1.30
777F	11.10	1.00
778	18.30	1.60
778F	14.25	1.25
779	21.60	1.90
779F	15.75	1.40

LOOSE LEAF FIELD BOOKS

	Each
790	\$ 2.50
790F	1.50
792C	1.90
Sheets	Per 100
0760	\$ 1.20
0760D	2.40
0763	1.20
0763D	2.40
0764	1.20
0764D	2.40
0772	1.20
0772D	2.40
0777	1.20
0777D	2.40

Gummed Reinforcements

798	\$.15
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TRAVERSE SHEETS

	Per 100	Doz.
807	\$ 2.75	\$.40
808	2.25	.35
809	Each	\$2.50

FIELD BAGS

	Each
814	\$ 9.25
815	6.00
816	2.50

Stake Strap

	Each
820	\$ 1.00

PROFILE PAPERS AND CLOTHS

	Per Roll	Yard
840G	\$ 7.50	\$.25
840O	7.50	.25
840 1/2 G	5.50	.20
840 1/2 O	5.50	.20

	Per Roll	Yard
841G	\$22.00	\$ 1.35
841O	22.00	1.35
842O	6.00	.20
842 1/2 O	4.50	.15
843G	22.00	1.35
844G	24.50	1.40
844O	24.50	1.40
844 1/2 O	18.50	1.10
846G	7.50	.25
846O	7.50	.25
847O	6.00	.20
848G	24.50	1.40
848O	24.50	1.40
850G	7.50	.25
850O	7.50	.25
850 1/2 G	5.50	.20
850 1/2 O	5.50	.20
851G	22.00	1.35
851O	22.00	1.35
852O	6.00	.20
852 1/2 O	4.50	.15

Profile Papers and Clothes (Con't.)

	Per Roll	Yard
853G	\$22.00	\$1.35
854G	24.50	1.40
854O	24.50	1.40
854½ O	18.50	1.10
856G	7.50	.25
856O	7.50	.25
857O	6.00	.20
858G	24.50	1.40
858O	24.50	1.40

CROSS SECTION PAPERS AND CLOTH IN ROLLS

	Per Roll	Yard
860G	\$ 7.50	\$.25
860O	7.50	.25
861G	22.00	1.35
861O	22.00	1.35
862O	6.00	.20
863G	22.00	1.35
864G	24.50	1.40
864O	24.50	1.40
865G	7.50	.25
865O	7.50	.25
867O	6.00	.20

MILLIMETER PAPERS AND CLOTHS IN ROLLS

	Per Roll	Yard
870O	\$ 7.50	\$.25
871O	22.00	1.35
872O	6.00	.20
874O	24.50	1.40

ENGRAVED CROSS SECTION SHEETS

	Quire	Sheet
880G	\$ 3.00	\$.15
880O	3.00	.15
881O	3.00	.15
882G	3.00	.15
882O	3.00	.15
883O	3.00	.15
884G	3.00	.15
885G	3.00	.15
885O	3.00	.15
886O	3.00	.15

	Per 1000	Per 100	Quire
890A	\$16.20	\$ 1.80	\$.50
891O	12.00	1.30	.35
892A	18.90	2.00	.55
893O	15.75	1.80	.50
894A	38.00	4.50	1.20
895O	31.50	3.70	1.10
900A	15.30	1.80	.50
901O	11.10	1.30	.35
902O	15.75	1.85	.60
903O	13.75	1.70	.50

FEDERAL AID SHEETS

	Per 100	Per 25	Sheet
904	\$ 9.40	\$ 2.35	
904C	85.00	23.75	\$ 1.05
905	9.40	2.35	
905C	85.00	23.75	1.05
906	9.40	2.35	
906C	85.00	23.75	1.05
907	9.40	2.35	
907C	85.00	23.75	1.05

RECORD SHEETS

	Per 100	Quire	Sheet
908	\$12.00	\$ 3.00	\$.15
909	12.00	3.00	.15

LOGARITHMIC PAPER

	Per 100	Quire	Sheet
925	\$ 3.20	\$ 1.00	\$.05
926	3.20	1.00	.05
927A	1.60	.50	.02½
927B	1.60	.50	.02½
927C	1.60	.50	.02½
927D	1.60	.50	.02½

ENGRAVED DATA PAPER

	Per 100	Quire	Each
349A			\$ 2.00
912	\$ 1.60	\$.50	\$.02½
912A	3.20	1.00	.05
913	1.60	.50	.02½
914	3.20	1.00	.05
915	1.60	.50	.02½
916	1.60	.50	.02½
916A	1.60	.50	.02½
916B	1.60	.50	.02½
917	1.60	.50	.02½
924	1.60	.50	.02½
919	1.60	.50	.02½
920	1.60	.50	.02½
921	1.60	.50	.02½
922	1.60	.50	.02½
923	1.60	.50	.02½
924½	1.60	.50	.02½
927A	1.60	.50	.02½
927B	1.60	.50	.02½
927C	1.60	.50	.02½
927D	1.60	.50	.02½

ISOMETRIC PAPERS

	Per 100	Quire	Sheet
928	\$ 3.00	\$.85	\$.05

TOWNSHIP PAPERS

	Per 100	Quire	Sheet
933	\$ 6.00	\$ 1.80	\$.10
934	6.00	1.80	.10
935	6.00	1.80	.10
937	14.40	4.00	.20
940	20.00	5.50	.25
943	20.00	5.50	.25

RULED CROSS SECTION SHEETS

	Ream	Quire	Sheet
949	\$27.00	\$ 1.60	\$.10
950	27.00	1.60	.10
951	27.00	1.60	.10
952	27.00	1.60	.10
954	27.00	1.60	.10
955	27.00	1.60	.10
956	27.00	1.60	.10

CROSS SECTION PADS

	Doz.	Each
961	\$ 5.50	\$.50
962	5.50	.50
963	5.50	.50
967	4.50	.40

	Doz.	Each
968	\$ 4.50	\$.40
969	4.50	.40

FIGURING PADS

	Doz.	Each
975	\$.80	\$.10
977	1.20	.10
978	1.55	.15
979	3.60	.30

Legal Tablets

	Doz.	Each
980	\$ 2.00	\$.20

TRACING SKETCH PADS

	Doz.	Each
990	\$ 6.60	\$.60
991	8.25	.75

DRAWING PAPER IN SHEETS

		Ream	Quire	Sheet
999	Watercolor, 22x30	\$ 80.00	\$ 4.50	\$.20
1000	Whatman's, 15x20	35.00	1.95	.10
	19x24	61.60	3.40	.15
	22x30	100.80	5.55	.30
	27x40	186.20	10.25	.50
	31x53	650.00	36.00	1.75
1004	Angelus, 19x24	51.00	2.95	.15
	22x30	72.00	4.20	.20
	27x40	118.00	6.80	.30
1002	Carmel, 19x24	19.80	1.05	.05
	22x30	28.60	1.55	.10
	27x40	50.60	2.75	.15
1005	Orland, 19x24	36.00	2.20	.10
	22x30	51.00	3.10	.15
	27x40	82.00	5.00	.25
1006	Sequoia, 19x24	24.50	1.50	.08
	22x30	37.50	2.20	.15
	27x40	60.00	3.50	.20
1007	Pacific, 19x24	18.00	.95	.05
	22x30	26.00	1.40	.10
	27x40	46.00	2.50	.15
1008	Modoc, 19x24	36.00	2.20	.10
	22x30	51.00	3.10	.15
	27x40	82.00	5.00	.25
1009	Mohave, 19x24	24.50	1.50	.08
	22x30	37.50	2.20	.15
	27x40	60.00	3.50	.20
1010	Elsinore, 9x12	4.50	.35	.02
	12x18	8.50	.60	.03
	18x24	16.50	1.10	.05
	24x36	32.00	2.00	.10

BOTANY PAPER

	500 Sheets
1013, 8½x11	\$ 3.75

MOUNTING AND POSTER BOARDS

	Doz.	Each
1014	\$ 7.50	\$.75
1016	12.00	1.00
1017	2.00	.20
1018A	3.00	.30
1018B	5.50	.55
1019	3.50	.35

HI-ART DRAWING BRISTOL

	Doz.	Each
1020—1 Ply, Smooth	\$ 1.35	\$.12 $\frac{1}{2}$
1 Ply, Med.	1.35	.12 $\frac{1}{2}$
2 Ply, Smooth	2.20	.20
2 Ply, Med.	2.20	.20
3 Ply, Smooth	3.30	.30
3 Ply, Med.	3.30	.30

CHARCOAL PAPER

	Ream	Quire	Sheet
1028, 19x25	\$19.20	\$ 1.20	\$.07 $\frac{1}{2}$

BRISTOL BOARDS

	Gross	Doz.	Each
1032	\$32.00	\$ 2.85	\$.25
1037	27.00	2.50	.25
1038	25.50	2.35	.20

ADHESIVE TAPES

	Doz.	Each
1042	\$ 4.20	\$.35
1043	3.00	.25
1044	4.20	.35
1045	1.00	.10
1046	4.80	.40
1047	7.20	.60
1048	10.00	1.00
1049A	-----	.25
1049B	-----	1.60
1050	-----	.15
1051	-----	.25

WHITE DRAWING PAPER IN ROLLS

	25 Yds.	10 Yds.	Yard
1060 Lassen— 36"	\$13.20	\$ 5.40	\$.70
42"	15.75	6.50	.80
63"	23.10	9.50	1.15
1061 Lassen— 63"	30.00	Per lb.	1.00
72"	31.75	12.50	1.40
		13.20	1.60
1064 Ramona—36"	13.20	Per lb.	1.00
42"	15.75	5.40	.70
63"	23.10	6.50	.80
		9.50	1.15
1065 Ramona—63"	30.00	Per lb.	1.00
		12.50	1.40
1068 Belmont—36"	13.20	Per lb.	1.00
42"	15.75	5.40	.70
63"	23.10	6.50	.80
		9.50	1.15
1069 Belmont—63"	30.00	Per lb.	1.00
		12.50	1.40
		Per lb.	1.00
1070 Avena— 30"	50 Yds. \$10.25	10 Yds. \$ 2.25	Yard \$.30
36"	12.00	2.65	.35
42"	14.00	3.10	.40
60"	20.25	4.50	.55
		Per lb.	.47

CREAM DRAWING PAPER IN ROLLS

	50 Yds.	10 Yds.	Yard
1080 Modoc, imported			
30"	\$10.30	\$ 2.45	\$.25
36"	12.10	2.85	.35
42"	13.95	3.30	.40
63"	23.60	5.30	.60
		Per lb.	.56
1080N Modoc, domestic			
30"	7.75	1.85	.20
36"	9.10	2.15	.25
42"	10.50	2.50	.30
		Per lb.	.45
1081 Mohave			
30"	6.15	1.30	.16
36"	7.35	1.55	.18
42"	9.70	2.10	.25
		Per lb.	.35

GREEN DRAWING PAPER IN ROLLS

	50 Yds.	10 Yds.	Yard
1084 Encinal			
36"	\$ 7.35	\$ 1.55	\$.18
42"	9.70	2.10	.25
		Per lb.	.35

DETAIL PAPERS IN ROLLS

	100 Yds.	50 Yds.	10 Yds.	Yard
1086A Elsinore				
36"	\$ 6.90	\$3.80	\$.95	\$.12
42"	7.50	4.30	1.10	.13
			Per lb.	.23
1086B Elsinore				
36"	9.00	4.90	1.10	.15
42"	10.00	5.70	1.45	.20
48"	12.25	6.75	1.70	.20
54"	15.00	8.35	2.10	.25
			Per lb.	.23
1086C Elsinore				
36"	11.20	6.20	1.60	.20
42"	12.40	6.90	1.75	.21
48"	14.50	8.00	2.00	.25
54"	16.75	9.50	2.70	.25
			Per lb.	.23

MOUNTED DRAWING PAPER SHEETS

	Sheet
1000MS —19x24	\$.65
22x30 .....	.95
27x40	1.70
1060MS —19x24 .....	.70
22x30	1.00
27x40	1.75
1064MS —19x24 .....	.70
22x30	1.00
27x40	1.75

	Sheet
1000DMS —19x24	\$1.30
22x30	1.90
27x40	3.40
1060DMS —22x30	2.00
27x40	3.50
1064DMS —22x30	2.00
27x40	3.50

MOUNTED DRAWING PAPER ROLLS

	10 Yds.	Yard
1068M —36"	\$16.60	\$ 2.05
42"	20.20	2.45
63"	28.90	3.60
1061M —63"	32.20	4.10
72"	40.00	5.00
1064M —36"	16.60	2.05
42"	20.20	2.45
63"	28.90	3.60
1065M —63"	32.20	4.10
1068M —36"	16.60	2.05
63"	28.90	3.60
1069M —63"	32.20	4.10
1070M —30"	13.00	1.60
36"	13.50	1.65
42"	16.00	1.95
60"	26.50	3.20
1080M —30"	13.00	1.60
36"	13.50	1.65
42"	16.00	1.95
63"	28.90	3.60

TRACING CLOTH IN ROLLS

	24 Yds.	Yard
1100 Excelsior		
30"	\$24.75	\$ 1.25
36"	28.25	1.40
42"	33.50	1.65
1101 Imperial		
24"	21.25	1.10
30"	22.25	1.20
36"	25.50	1.30
38"	27.75	1.45
42"	30.50	1.55
48"	38.75	2.15
54"	48.00	2.70
1102 Paramount		
30"	19.25	1.00
36"	21.25	1.10
42"	26.25	1.35
1103 Arkwright		
30"	20.75	1.05
36"	22.75	1.15
42"	28.00	1.45
1104 White		
30"	19.25	1.00
36"	21.25	1.10
42"	26.25	1.35

TRACING CLOTH REQUISITES

1106	Each	
1107—4 oz.	\$	.35
1107—1 oz.		1.25
		.40

TRACING PAPERS IN ROLLS

1117 Trans-Vel	20 Yds.	Yard
30"	\$ 4.25	\$.25
36"	4.75	.30
42"	5.25	.30

1118 Trans-Vel		
30"	4.50	.30
36"	5.00	.30
42"	5.50	.35

1120 Vellum		
30"	4.00	.25
36"	4.60	.30
42"	5.00	.30

1121 Alturas		
36"	5.00	.30
42"	5.50	.35

1122 Plumas		
36"	3.85	.25
42"	4.25	.30

1123 Plumas		
36"	5.00	.30
42"	5.25	.30

1124 Orinda		
36"	2.75	.20
42"	3.25	.25

1125N Stockton		
36"	1.50	.10
42"	1.75	.12 1/2

1126 Sierra		
42"	2.25	.15

1127 Sierra		
42"	3.00	.20

1128 Colusa	50 Yds.	Yard
36"	4.00	.15
42"	4.60	.15

1129 Shasta	20 Yds.	Yard
42"	3.00	.20

1130 Avalon	50 Yds.	Yard
42"	5.90	.20
57"	7.50	.25

1132 Exposition		
36"	2.25	.07 1/2
42"	2.50	.07 1/2
48"	3.00	.10

1133 Monterey	50 Yds.	Yard
40"	\$ 2.75	\$.10

1134 Vernalia	20 Yds.	Yard
42"	\$ 3.00	\$.20

1136 Tallac	50 Yds.	Yard
42"	\$ 5.75	\$.20

1137 Sonora		
36"	3.00	.10
42"	3.50	.15

1139 Madera		
36"	4.20	.10
42"	4.80	.15
60"	7.60	.20

1140 Madera		
36"	4.85	.15
42"	5.70	.15

1142 Beverly		
36"	4.10	.15
42"	4.70	.15

1143 Beverly		
36"	4.70	.15
42"	5.40	.15

1144 Redondo		
36"	5.00	.15
42"	5.75	.15

1145 Yosemite	20 Yds.	Yard
42"	\$ 2.00	\$.15

TRACING PAPERS IN SHEETS

1117S Trans-Vel—24x36	Per 100	\$16.20
18x24		8.10

1118S Trans-Vel—24x36		17.00
18x24		8.50

1124S Orinda —24x36		9.60
18x24		4.80

1137S Sonora —24x36		6.60
18x24		3.30

CUTTING KNIVES

1149	Each	
1149A	\$	1.25
1150		.50
		.75

DRAWING TABLETS

1156	Dozen	Each
1157A	\$ 1.75	\$.15
1157B	3.00	.25
1158A	3.00	.25
1158B	3.50	.30
	4.75	.40

BLUEPRINT PAPERS

	50 Yds.	10 Yds.
1180 Apollo		
30"	\$ 3.95	\$ 1.30
36"	4.70	1.55
42"	5.40	1.80
1181 Steorra		
30"	3.60	1.20
36"	4.15	1.40
42"	4.70	1.55
1182 Velvet		
30"	3.95	1.30
36"	4.70	1.55
42"	5.40	1.80
1183 Paramount		
30"	8.10	2.70
36"	9.50	3.20
42"	10.85	3.60
54"	13.90	4.70
1184 Parchment		
24"	4.45	1.50
30"	5.30	1.80
36"	6.30	2.10
42"	7.25	2.40
54"	9.10	3.05
1185 Parchment		
30"	6.30	2.10
36"	7.50	2.50
42"	8.70	2.90
1186 Wawona		
30"	8.10	2.70
36"	9.50	3.20
42"	10.85	3.60
54"	13.90	4.70

BLUEPRINT CLOTH

	50 Yds.	10 Yds.
1190 Paramount		
30"	\$35.40	\$11.80
36"	37.90	12.60
42"	45.35	15.10
54"	80.15	26.75
1191 Paramount		
30"	46.80	15.60
36"	49.55	16.55
42"	59.65	19.90

BLUEPRINT INTENSIFIER

	Per Lb.
1193	\$.35

BROWN PRINT PAPERS AND CLOTHS

	50 Yds.	10 Yds.
1195—30"	\$11.90	\$ 3.95
36"	13.80	4.60
42"	15.95	5.35
54"	25.40	8.45

	50 Yds.	10 Yds.
1196—30"	\$10.80	\$ 3.60
36"	12.70	4.25
42"	14.80	4.95
54"	22.45	7.50
1197—30"	43.70	14.60
36"	46.50	15.55
42"	55.20	18.40
54"	93.60	31.20
1198—30"	51.10	17.05
36"	55.30	18.50
42"	66.10	22.10

FIXING SALT

	Each
1200	\$.10
1202 .....	.40

TRANSPARENTIZING FLUID

	Each
1205	\$ 1.50
1207	5.20

OPAQUE

	Each
1208	\$.60

BLACK LINE PAPERS AND CLOTHS

	50 Yds.	10 Yds.
1210 Tioga		
30"	\$ 5.40	\$ 1.80
36"	6.40	2.13
42"	7.40	2.45
54"	10.80	3.60
1211 Tioga		
30"	5.40	1.80
36"	6.40	2.13
42"	7.40	2.45
54"	10.80	3.60
1214 Tioga		
30"	36.40	12.15
36"	38.40	12.95
42"	46.00	15.35
54"	78.00	26.00
1216 Tioga		
30"	36.40	12.15
36"	38.40	12.95
42"	46.00	15.35

TIOGA DEVELOPING SALTS

	Each
1212	\$.75
1212½ .....	.40

ERASING FLUID

	Each
1220	\$.30
1221 .....	.30
1222 .....	.30
1223 .....	.30

OZALID PAPERS AND CLOTHS

	50 Yds.	10 Yds.
1019—30"	\$ 3.85	\$ 1.28
36"	4.60	1.53
42"	5.35	1.78
1024—30"	4.10	1.37
36"	4.90	1.63
42"	5.70	1.90
54"	8.10	2.70
2119—30"	3.85	1.28
36"	4.60	1.53
42"	5.35	1.78
2124—30"	4.10	1.37
36"	4.90	1.63
42"	5.70	1.90
54"	8.10	2.70
3019—30"	3.85	1.28
36"	4.60	1.53
42"	5.35	1.78

	50 Yds.	10 Yds.
3024—30"	\$ 4.10	\$ 1.37
36"	4.90	1.63
42"	5.70	1.90
54"	8.10	2.70
4114—30"	9.75	2.35
36"	11.70	2.80
42"	13.65	3.30
1400—30"	37.50	9.00
36"	45.00	10.80
42"	52.50	12.60
1444—36"	63.00	15.12
42"	73.50	17.64
	20 Yds.	10 Yds.
4300—30"	\$46.70	\$23.35
36"	56.00	28.00
42"	65.40	32.70

MOUNTING SERVICE

Mounting on cloth, single sheets.....	sq. ft.	\$.15
Mounting on cloth, matched sheets.....	sq. ft.	.16
Mounting on cloth cut to fold.....	sq. ft.	.30
Mounting Geological sheets to fold.....	each	.75
Mounting Geological sheets, cloth.....	each	.50
Mounting on Beaver Board.....	sq. ft.	.30
Common sticks.....	lin. ft.	.06
Half round sticks.....	lin. ft.	.08

Minimum charge, 40c

UNPREPARED BLUEPRINT PAPER AND CLOTH

	50 Yds.
1180U—30"	\$ 4.00
36"	4.50
42"	5.25
1181U—30"	4.25
36"	5.25
42"	6.10
1184U—30"	5.50
36"	6.50
42"	7.80
54"	10.50
1185U—30"	6.50
36"	7.50
42"	8.50
	10 Yds.
1190U—30"	\$ 7.00
36"	8.00
42"	10.50
54"	17.25
1191U—30"	9.80
36"	11.00
42"	12.25

	Each
43"	\$ 1.95
55"	3.00
1231—31"	2.10
37"	2.45
43"	2.75
55"	3.80
1232—32"	.70
37"	.80
43"	.90

	Doz.	Each
1237—12"	\$ 2.15	\$.21
18"	2.60	.26
24"	2.90	.29
36"	3.60	.36
42"	4.10	.41
48"	4.30	.43
1241—12"	.50	.05
18"	.60	.06
24"	.80	.08
30"	1.00	.10
36"	1.20	.12
42"	1.40	.14
1242—12"	.50	.05
18"	.80	.08
24"	1.20	.12
30"	1.40	.14
36"	1.60	.16
42"	1.80	.18

MAILING AND STORAGE TUBES

	Each
1230—31"	\$ 1.70
37"	1.85

BLUEPRINT FRAMES

	Frame only	Frame with felt pad	Frame with pad and polished plate glass
1265A—20x24	\$21.00	\$25.50	\$32.50
1265B—24x36	23.00	30.00	41.50
1265C—30x42	31.50	43.00	63.00
1265D—36x48	38.00	55.00	85.00
1265E—36x60	46.00	66.00	104.00
1265F—42x60	53.00	75.00	115.00
1265G—42x72	75.00	105.00	158.00

Small Frames

1271A	Each \$12.50
1271B	18.00

Pads for Blueprint Frames

	Each
1266A—20x26"	\$ 4.50
1266B—24x30"	7.00
1266C—30x42"	11.50
1266D—36x48"	17.00
1266E—36x60"	20.00
1266F—42x60"	22.00
1266G—42x72"	27.00
1267A—20x26"	2.10
1267B—24x30"	3.00
1267C—30x42"	5.00
1267D—36x48"	5.70
1267E—36x60"	7.00
1267F—42x60"	10.50
1267G—42x72"	12.50

BLUEPRINT CARS

1275A	Each Price on Application
1275B	Price on Application
1275C	Price on Application

VACUUM PRINT FRAMES

Printing Surface	Frame with Rubber Blanket and Hose
1276A—44x74	\$ 418.50
1276B—56x86	491.00
1276C—56x100	538.00
1276D—56x122	608.00
1276E—56x146	825.00
1276F—56x158	895.00
1277A—44x74	515.00
1277B—56x86	591.00
1277C—56x100	650.00
1277D—56x122	718.00
1277E—56x146	940.00
1277F—56x158	1015.00

Vacuum Outfit

1278A	Each \$ 85.00
1278B	100.00

BATH TRAYS

	Each
1280—12x17	\$ 4.50
17x22	6.00
20x24	9.00
24x30	12.35
1281—20x24	12.50
24x30	15.50
30x42	23.00
36x48	29.00
36x60	34.00
42x60	40.00
42x72	46.00

PEASE BLUE PRINT MACHINE

1290	Each \$475.00
1291	485.00

Model 7 THREE TUBE Printer
wired for 110 or 220 volts alternating current, 25 or 40 cycle, single phase, add..... 70.00

1292 535.00

1293 545.00

Model 7 FOUR TUBE Printer
wired for 110 or 220 volts alternating current, 25 or 40 cycle, single phase, add..... 82.50

Prices f. o. b. Chicago. Approximate shipping weight, 750 lbs.

Accessories

1294	See above
1295	See above
1296	\$19.50

WICKES SIMPLEX BLUE PRINTER

1300	Each \$270.00
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Extra Lamps

	Each
1302	\$19.50
1309	19.50

WICKES PRINTERS AND OZALID DEVELOPERS

	Each
1305	\$405.00
1306	145.00
1307	185.00

Accessories and Parts

	Each
1301A	\$ 2.25
1301B	3.50
1301C	26.00
1301D	5.50
1301E	18.50
1301F	.40
1310	2.25
1311A	50.00
1311B	80.00
1311C	10.00

BLUE PRINT ROOM REQUISITES

1312	Doz.	\$.60
1314—10"	Each	\$ 1.50
12"		1.95
14"		2.10
1316—8"		4.10
10"		4.95
12"		8.00
15"		17.00
18"		26.50
24"		34.50
1317		25.00

STANDARD DOCUMENTS

1335B	Per 100	\$33.25	Each	\$.35
1335BB		14.25		.15
1335A		47.50		.50
1335C		9.50		.10
1335D		9.50		.10
1335E		9.50		.10
1336A		1.90		.02
1336		71.25		.75
1335F		9.50		.10
1335H		9.50		.10
1335I		5.70		.06
1335J		19.00		.20
1335K		11.40		.12
1335L		38.00		.40
1330				1.40

ZENITH DRAWING INSTRUMENTS

1400	Each	\$ 2.50
1401		2.75
1402		3.00
1403		4.75
1404		4.90
1405		5.00
1406		3.75
1407		4.00
1408		4.25
1410		3.50
1411		3.75
1412		4.00
1414		3.25
1415		7.50
1416		6.50
1424		.85
1426		1.00
1430S		3.25
1432S		4.25
1434S		4.00
1440C		4.00
1442C		5.00
1444C		4.75
1465D		6.00
1466		6.00
1466C		6.50
1467C		7.75

1472NL	Each	\$12.00
1470-2		4.75
1471		5.75
1474- $\frac{3}{4}$		12.50
1474- $\frac{3}{4}$ H		14.00

Parts for Zenith Drawing Instruments

1485A	Each	\$.25
1485B		.35
1485C		.30
1485D		.15
1485E		.15
1485F		.75
1485G		.20
1485H		.25
1485I		.25
1485J		.25
1485K		.30
1485L		.20
1485M		.30
1485N		.30
1485O		.25
1485P		.15
1485Q		.30
1485R		.25
1485S		.75
1485T		1.50
1485U		1.25
1485-4		.25
1485-5		.35
1485-6		.35
1485-7		.20
1486		.20
1486-R		.60
1487A		.25
1487B		.10
1489A-F		.15

ZENITH PROPORTIONAL DIVIDERS

1491C	Each	\$25.00
1493C		30.00
1494C		33.50

ZENITH BEAM COMPASS AND BARS

1496C	Each	\$19.50
1497		5.00
1498C		5.25
1499A—24"		.80
30"		1.00
36"		1.10
42"		1.30
48"		1.60
60"		2.00
1499C—24"		.80
30"		1.00
36"		1.10
42"		1.30
48"		1.60
60"		2.00

ZENITH DRAWING SETS

	Each
1504S	\$39.00
1505C	43.50
1506C	46.00
1507C	52.50

ALTENEDER DRAWING INSTRUMENTS

	Each
1550	\$ 2.75
1551	3.00
1552	3.30
1560	3.60
1561	3.85
1562	4.15
1564	3.60
1591	7.70

1594- $\frac{3}{4}$ H	Each \$16.00
1594- $\frac{3}{4}$ H-SH	16.50
1556-SH	4.95
1557-SH	5.25
1558-SH	5.50
1556-ASH	4.95
1557-ASH	5.25
1558-ASH	5.50
1571	4.40
1572-SH	6.60
1574	4.40
1581	5.25
1582-SH	7.45
1584	5.25
1586-SH	9.35
1587-SH	11.00

PEERLESS DRAWING INSTRUMENTS

	Each
1600	\$ 1.85
1601	2.00
1602	2.15
1601C	2.25
1604	2.80
1608	2.50
1612	2.45
1633	3.00
1633D	5.00
1634	2.40
1635	7.50
1637	4.20
1661	3.00
1662	4.50
1664	3.50
1665C	5.75
1666	4.50
1667C	6.00
1668	3.50
1668C	4.25
1669	4.00
1669C	4.75
1680-1	2.50
1680-2	3.25
1681-2	4.00
1680-3L	7.50
1682NL	6.25
1684	6.75
1684X	7.75
1684H	7.75

Parts for Peerless Drawing Instruments

	Each
1685A	\$.25
1685B .....	.35
1685C .....	.30
1685D .....	.15
1685E .....	.15
1685F .....	.60
1685G .....	.20
1685H .....	.25
1685I .....	.25

	Each
1685J	\$.25
1685K .....	.30
1685L .....	.20
1685M .....	.30
1685N .....	.30
1685O .....	.25
1685P .....	.15
1685Q .....	.60
1685R .....	.25
1685S .....	.75
1685T	1.50
1685U	1.20
1685W .....	.60
1685-4 .....	.25
5 .....	.35
6 .....	.35
7 .....	.20

PEERLESS DRAWING SETS

	Each
1720C	\$25.00
1722C	30.00
1724S	18.50
1727C	42.50

SUPERIOR DRAWING INSTRUMENTS

	Each
1700	\$ 1.40
1702	1.50
1703	3.80
1704	3.90
1705	4.00
1711	2.00
1723	5.50
1730S	1.50
1732S	2.00
1734S	1.85
1766	3.00
1767C	3.75
1740C	2.25
1742C	3.00
1744C	2.65

	Each
1780-2	\$ 3.75
1781	4.50
1784	8.00

Proportional Dividers

	Each
1790C	\$12.50
1791C	16.50
1794	5.50
1794G	6.00

Beam Compasses

	Each
1795C	\$16.50
1796C	14.50
1797	5.00
1797C	5.25
1798C	5.25
1796 $\frac{1}{2}$ C	11.50
1799	7.50
1799A	1.20
1799B	3.20
1799C .....	.40

SUPERIOR DRAWING SETS

	Each
1826S	\$16.50

RELIABLE DRAWING INSTRUMENTS

	Each
1840	\$ 1.00
1841	1.10
1842	1.20
1840SC	1.35
1841SC	1.45
1842SC	1.60
1843	2.50
1844	2.50

Ruling Pen Assortments

	Each
1845	\$13.50
1846	10.00
1847	6.00

RELIABLE DRAWING INSTRUMENTS

	Each
1850S	\$ 1.20
1852S	1.65
1854S	1.40
1860	2.25
1862	2.75
1864	2.50
1880-2S	2.20
1881S	2.70
1884- $\frac{3}{4}$ S	4.90
1880-2R	2.50
1881R	2.75
1882N	5.00
1884- $\frac{3}{4}$ R	5.50

RELIABLE DRAWING SETS

	Each
1894S	\$12.25
1894N	18.00
1896C	12.50
1898	19.75

REPAIR KITS

	Each
1899A	\$12.00
1899B	15.00
1899C	10.00
1899D	10.00
1899E	10.00
1899F	10.00
1899G	10.00

UNIVERSAL DRAWING INSTRUMENTS

	Each
1900	\$.70
1902 .....	.80
1900C .....	.85
1902C .....	.95
1910S .....	.90
1912S	1.20
1914S	1.10
1910R .....	.75
1912R	1.00
1914R .....	.90
1915R	1.35
1930-2S	1.25
1931S	1.50
1934- $\frac{3}{4}$ S	3.50
1930-2R	1.25
1931R	1.50
1934- $\frac{3}{4}$ R	3.00
1940	1.65
1942	2.25
1944	1.90
1950	1.90
1952	2.50
1954	2.25

UNIVERSAL DRAWING SETS

	Each
1953S	\$ 7.75
1955S	10.25
1955R	9.80

MARVEL DRAWING SETS

	Each
1959N	\$ 8.20
1965R	6.95
1965S	7.20
1965N	7.20

BANNER DRAWING INSTRUMENTS

	Each
1960	\$.50
1960C .....	.60
1960-2R	1.00
1964- $\frac{3}{4}$ R	2.25

BANNER DRAWING SETS

	Each
1961R	\$ 2.70
1968R	4.35
1969R	5.85
1962BL	1.35

EXTRA PARTS FOR DRAWING INSTRUMENTS

	Each
1985A	\$.20
1985B .....	.30
1985C .....	.25
1985D .....	.15
1985E .....	.15
1985F .....	.40
1985G .....	.20
1985H .....	.20
1985I .....	.20
1985J .....	.15
1985K .....	.20
1985L .....	.20
1985M .....	.25
1985N .....	.20
1985O .....	.25
1985P .....	.15
1985Q .....	.25
1985R .....	.25
1985S .....	.40
1985T .....	.90
1985U .....	.65
1985W .....	.25
1985-4 .....	.25
1985-5 .....	.35
1985-6 .....	.35
1985-7 .....	.20
1985V .....	.05

SCHOOL COMPASSES

	Doz.	Each
1981P	\$ 1.20	\$.10
1983	4.00	.35
1984P	3.00	.25
1987	1.10	.10

BLACKBOARD COMPASS SETS

	Each
1988B	\$.90
1989N	6.25
1989A	1.50
1989B	1.35
1989C	1.75
1989D	2.00

COMPLETE DRAWING OUTFITS

	Each
1990	\$18.00
1991	14.50
1992	13.50
1993	8.00
1994	4.85

PLANIMETERS

	Each
2000	\$ 31.00
2005	46.00
2006	92.50
2010	56.00
2020	39.00
2021	54.00
2022	64.00
2029	215.00
2030	215.00
2032	275.00

PANTOGRAPHS

	Each
2076	\$292.00
2080	168.00
2082	193.00
2085	85.00
2087	97.00
2091	7.50
2092	3.50
2095	1.75
2097 .....	.70

CHEMISTRY STENCILS

	Each
2100	\$.25

CAMERA LUCIDA

	Each
2101C	\$45.00
2101D	35.00

BRISCHOGRAPH	
	Each
2102A	\$27.00
2102B	11.50

MAP MEASURES	
	Each
2103	\$ 3.60
2104	4.60
2105	6.25
2107	3.35

ARM PROTRACTORS	
	Each
2110	\$150.00
2117	49.00
2118	6.00
2117C	60.00
2121	35.00
2121C	40.00
2122	45.00
2122C	50.00
2126	9.50
2128	36.00
2128C	40.50
2129	50.00
2129C	55.00
2136	29.50
2136C	34.00
2137	36.50
2137C	42.25
2150	13.50
2150C	16.50
2154	2.50

GERMAN SILVER PROTRACTORS	
	Each
2161	\$ 3.75
2163	5.40
2165	8.00
2171	4.90
2173	6.50
2180 .....	.90
2181	1.35
2182	1.50
2184	2.50

METAL PROTRACTORS		
	Doz.	Each
2189		\$.15
2191 .....		.25
2192 .....		.85
2194	\$ 1.00	.10
2195	1.00	.10
2196	1.00	.10
2196 1/2	1.50	.15
2199	1.50	.15

TRANSPARENT CELLULOID PROTRACTORS	
	Each
2210	\$ 2.40
2211	3.40
2215	4.00
2216	5.25

	Each
2217	\$ 7.00
2230 .....	.35
2231 .....	.45
2232 .....	.50
2234	1.00
2235	2.00
2237 .....	.70
2238	1.00
2241	5.00
2246	1.20
2250	1.20
2252	1.40
2256 .....	.85

Transparent Scale Protractors	
	Each
2259	\$.25
2260 .....	.25
2261 .....	.25
2262 .....	.25
2263 .....	.25
2264 .....	.25
2265 .....	.25
2266 .....	.25
2269 .....	.50

PAPER PROTRACTORS	
	Each
2272	\$.20
2273 .....	.40
2274 .....	.20
2275 .....	.30

UNIVERSAL DRAFTING MACHINES HARDENED JOINT AND SOLID ROD DRAFTING MACHINES

Prices of Machine only, without scales.

	Standard Protractor	Architect's Protractor	Civil Eng'r's Protractor
Mid-Anchor, sizes 18, 21, 24 or 28.....	\$62.50	\$65.00	\$ 92.50
Corner Anchor, sizes 18, 21, 24 or 28.....	60.00	62.50	90.00
Mid-Anchor, sizes 32 and 36.....	70.00	72.50	100.00
Corner Anchor, sizes 32 and 36.....	67.50	70.00	97.50

BALL BEARING TUBULAR ROD DRAFTING MACHINES

Prices of Machine only, without scales.

	Standard Protractor	Architect's Protractor	Civil Eng'r's Protractor
Mid-Anchor, sizes 18, 21, 24 or 28.....	\$77.50	\$80.00	\$107.50
Corner Anchor, sizes 18, 21, 24 or 28.....	75.00	77.50	105.00
Mid-Anchor, sizes 32 and 36.....	85.00	87.50	115.00
Corner Anchor, sizes 32 and 36.....	82.50	85.00	112.50
Standard or Architect's Protractor, with vernier to 5 minutes extra			3.50

THE JUNIOR DRAFTING MACHINE

	Price without Scales
Mid-Anchor, Standard Protractor.....	\$27.00
Corner Anchor, Standard Protractor.....	25.00

SCALES FOR DRAFTING MACHINES

	Each		Each
2295A to R— 6" Cel-O-Met.....	\$ 3.00	B2295A to R— 6" Boxwood.....	\$ 2.00
2295A to R—12" ".....	3.50	B2295A to R—12" ".....	2.50
2295A to R—18" ".....	4.50	B2295A to R—18" ".....	3.50
2295A to R—24" ".....	6.00	B2295A to R—24" ".....	4.25

STRAIGHT EDGES FOR DRAFTING MACHINES

	Each
2296A	\$ 2.25
2296B	2.50
2296C	2.75
2297A	2.25
2297B	2.50
2297C	2.75

TRIANGULAR BOXWOOD SCALES

	Each
2301	\$ 1.00
2302	1.30
2302S .....	.75
2307	1.85
2312	2.50
2321	1.00
2322	1.30
2322S .....	.75
2327	1.30
2332D	1.30

Scale Guards and Sheaths

	Each
2370	\$.25
2371— 6" .....	.50
2371—12" .....	.65
2371—18" .....	.90
2371—24"	1.10
2372— 6" .....	.50
2372—12" .....	.65
2372—18" .....	.90
2372—24"	1.10

METRIC SCALES

	Each
2380	\$ 1.45
2381	1.85
2386	4.60
2390 .....	.85
2391	1.10
2392	1.20
2393	2.40
2395	1.20
2396	1.70
2397	2.00
2398	3.60

FLAT BOXWOOD SCALES

	Each
410	\$.85
412 .....	.85

	Each
2413	\$.85
2415	1.20
2417	1.20
2418	1.20
2440 .....	.85
2441	1.20
2447	1.20
2451	1.20
2461	2.00
2480	1.20
2481	1.20

CASES FOR SCALES

	Each
2485A	\$ 4.50
2485B	5.00
2485C	5.50
2485D	6.00
2485E	6.50

STEEL SCALE RULES

	Each
2487	\$ 1.85
2488	1.85

TRIANGULAR WHITE EDGE SCALES

	Each
2341	\$ 2.30
2341X	2.75
2341M	3.00
2342	3.60
2342X	4.00
2342M	4.50
2344X	10.50
2344M	12.00
2347X	4.60
2347M	5.00
2352X	4.60
2352M	5.00
2361	2.30
2361X	2.75
2361M	3.00
2362	3.60
2362X	4.00
2362M	4.50
2364X	10.50
2364M	12.00
2367	3.60
2367X	4.00
2367M	4.50
2369X	10.50
2369M	12.00

CEL-O-MET FLAT WHITE EDGE SCALES

	Each
2510M	\$ 1.35
2510B	1.20
2512M	1.35
2512B	1.20
2513M	1.35
2513B	1.20
2514M	1.85
2514B	1.70
2515M	2.25
2515B	2.00
2517M	2.25
2517B	2.00
2518M	2.25
2518B	2.00
2519M	2.65
2519B	2.40
2520M	2.25
2520B	2.00
2521M	2.25
2521B	2.00
2522M	2.25
2522B	2.00
2523M	2.65
2523B	2.40
2530M	2.25
2530B	2.00
2531M	2.25
2531B	2.00
2532M	2.25
2532B	2.00
2533M	2.65
2533B	2.40
2535M	2.25
2535B	2.00
2536M	2.25
2536B	2.00
2537M	2.25
2537B	2.00
2540M	1.35
2540B	1.20
2541M	2.25
2541B	2.00
2542M	2.50
2542B	2.20
2544M	6.00
2544B	5.00
2546M	1.35
2546B	1.20
2547M	2.25
2547B	2.00
2549M	6.00
2549B	5.00
2551M	2.25

Cel-O-Met Flat White Edge Scales (Con't.)

	Each
2551B	\$ 2.00
2561M	3.60
2561B	3.30
2563M	8.50
2563B	7.70
2566M	1.35
2566B	1.20
2567M	2.25
2567B	2.00
2568M	6.00
2568B	5.00
2570M	2.25
2570B	2.00
2572M	2.25
2572B	2.00
2573M	2.25
2573B	2.00
2574M	2.25
2574B	2.00
2575M	2.65
2575B	2.40
2576M	1.35
2576B	1.20
2577M	2.25
2577B	2.00
2578M	2.85
2578B	2.60
2579M	2.85
2579B	2.60
2580M	2.20
2580B	2.20
2581M	2.20
2581B	2.20

TRANSPARENT UNDERWRITERS' SCALES

	Each
2663	\$ 3.25
2664	4.25

TRANSPARENT FLEXIBLE RULERS

	Each
2666	\$.15
2667 .....	.25

WOODEN RULERS

		Each
2672—12" .....	\$	.20
2672—15" .....		.25
2672—18" .....		.30
	Doz.	Each
2673	\$.90	\$.10
2673B	1.10	.10
2674 .....	.50	.05
2674B .....	.60	.05
2675	1.10	.10
2675 1½ .....	.55	.05

YARD AND METER STICKS

	Doz.	Each
2676	\$ 2.75	\$.25
2677	4.80	.45
2679	7.00	.65

PROTRACTOR RULES CALIPER RULES

	Each
2681	\$ 2.50
2685 .....	.75
2686	1.10
2687	2.10

FLEXIBLE STEEL TAPE RULES

	Each
2690	\$ 1.50
2690D	1.75
2691 .....	.75
2692	1.25
2696	3.25
2696D	3.25
2700	1.00
2700D	1.25

FOLDING AND SPRING JOINT RULES

	Each
2728	\$ 1.20
2728 1/2	1.50
2734 .....	.40
2734W .....	.45
2736 .....	.55
2736W .....	.60
2746 .....	.55
2746W .....	.60
2756 .....	.55
2756W .....	.60
2766 .....	.55
2766W .....	.60
2786W .....	.80

ALUMINUM RULES

	Each
2796	\$ 1.60
2796D	1.80

FOLDING STEEL RULES

	Each
2801	\$.55
2811 .....	.55
2823	1.65
2831 .....	.15
2833 .....	.15

MANUAL TRAINING RULES

	Each
2841	\$.50
2842	1.00

PARALLEL RULES

	Each
2861	\$ 1.75
2862	2.00
2863	2.40
2864	2.80
2865	3.60
2932	16.50
2934	22.00
2935	40.00
2932C	18.50
2934C	24.00
2935C	43.00

SECTION LINERS

	Each
2948	\$ 4.25
2949	4.75

ELLIPSOGRAPHS

	Each
2950	\$ 1.50
2951	3.00
2952	5.40

SLIDE RULES

	Each
2958	\$15.00
2959	25.00
2960	5.25
2964	6.20
2969	15.00
3060H .....	.30
2970	3.25
2971	3.00
2972	2.50
2974	2.00
2980	6.25
2984	7.00
2984L	7.80
2989	17.50
3034	9.00
3044	10.00
3054	9.50
3054L	10.50
3056L	12.00
3057L	

Slide Rule Accessories

	Each
3058	\$.60
3060A .....	.75
3060B	1.00
3060C	1.65
3060D	1.10
3060E .....	.55
3060F .....	.65
3060G .....	.65
3062A .....	.35
3062B .....	.50
3065	2.75
3068—5" .....	.45
3068—10" .....	.65
3068—20"	1.25

Slide Rule Accessories (Con't.)

	Each
3069— 5"	\$ 1.15
3069—10"	1.50
3069—20"	2.75
3069M— 5"	2.50
3069M—10"	3.00
3069M—20"	4.25
3070 .....	.50

CIRCULAR SLIDE RULES

	Each
3077	\$ 2.00
3078	5.00
3079	2.50

SPECIAL SLIDE RULES AND COMPUTORS

	Each
3097	\$ 1.40
3098	1.40
3104	1.50
3110	6.50
3111	16.00

STEEL TRIANGLES

	Each
3175—10½"	\$ 9.20
3175—15"	13.90
3176— 8"	9.20
3176—12"	13.90

CELLULOID IN SHEETS

	Each
3220—Full sheets, 20x50	\$10.50
Running inch .....	.30
Square inch .....	.03
3221—Full sheets, 20x50	8.40
Running inch .....	.25
Square inch .....	.02

HYPERBOLAS, ELLIPSES AND PARABOLAS

	Set
3230	\$ 4.75
3232	6.00
3233	4.75
3234	10.00

IRREGULAR CURVES

	Each
3240	\$ 2.40
Instructions .....	.25
3242	1.60
3244	2.20
3246	1.50

FRENCH CURVES

	Each
3251—Pat. 1	\$.55
2 .....	.55

TRANSPARENT CELLULOID TRIANGLES

	Each
3180— 4"	\$.30
6" .....	.40
7" .....	.45
8" .....	.50
9" .....	.65
10" .....	.85
12"	1.15
14"	1.85
16"	2.40
18"	3.40
3181— 4" .....	.35
6" .....	.45
7" .....	.60
8" .....	.70
9" .....	.95
10"	1.20
12"	1.70
14"	2.55
16"	3.90
18"	4.90
3182— 4" .....	.40
6" .....	.50
8" .....	.65
10" .....	.95
3185— 8"	Doz. \$ 3.28
9"	Each \$.35
10"	4.08 .40
12"	4.72 .55
	7.04 .70

	Doz.	Each
3186— 6"	\$ 2.88	\$.30
7"	3.96	.40
8"	4.72	.55
10"	7.36	.70
12"	11.12	1.20

ADJUSTABLE TRIANGLES

	Each
3192A	\$ 3.00
3192B	4.60
3192C	6.25

LETTERING INSTRUMENTS

	Each
3194	\$ 1.00
3195—6" .....	.95
3195—7"	1.00
3195—8"	1.10
3196—5" .....	.95
3196—6"	1.00
3196—7"	1.15

MECHANICAL ENGINEERS' TRIANGLE

	Each
3197	\$ 2.00

	Each
3222—Full sheets, 20x50	\$ 6.00
Running inch .....	.18
Square inch .....	.01½
3223—Full sheets, 20x50	1.60
Running inch .....	.05
Square inch .....	.004
3224—Full sheets, 20x50	1.60
Running inch .....	.05
Square inch .....	.004

	Each
3251—Pat. 3	\$.70
4 .....	.70
5 .....	.70
6 .....	.65
7 .....	.70
8 .....	.55
9 .....	.70
10 .....	.85
11 .....	.45
12	1.30
13	1.85

SPLINES AND SPLINE WEIGHTS

	Each
3256—24"	\$.85
30" .....	.95
36"	1.05
42"	1.20

	Each
3256—48"	\$ 1.35
60"	1.90
3260	3.00
3265	36.00

ADJUSTABLE CURVES

	Each
3271	\$ 1.00
3272	1.90
3278	2.35
3279	3.95

COLLINS' HIGHWAY CURVES

	Set
3285	\$30.00
Separate	1.35
3286	30.00
Separate	1.35

METAL BASE DRAWING TABLES

Francisco

	Each
3518—36x48	\$ 75.00
3518—36x60	80.00
3518—42x72	95.00
3518—42x84	102.00
3516A	9.00

CELLO CLIP MAP FILES

	Each
3526-C24	\$61.50
3526-C30	67.00
3526-C36	73.00
3526-S24	31.50
3526-S30	33.00
3527A—Box of 100	4.80
3527B—Box of 75	3.95
3527C—Box of 25	5.25

	Each
3528-C24	\$14.50
3528-C30	15.00
3528-C36	19.00

FOUR POST DRAWING TABLES

	Each
3529A—36x60	\$ 59.50
3529B—36x72	66.00
3529C—42x84	79.50
3529½ A—36x60	65.00
3529½ B—36x72	71.50
3529½ C—42x84	85.00
3530B—36x72	92.00
3530C—42x84	108.00
3531A—36x60	94.00
3532—36x72	133.00
3533—42x84	155.00
3535A—36x60	125.00
3535B—36x72	130.00
3535C—42x72	137.50

ILLUMINATED TRACING TABLES

	Each
3537	\$107.00
3538	73.00

SECTIONAL FILING CASES

	Each
3545A	\$55.25
3545B	18.50
3545C	44.75
3545D	40.75
3545E	25.00
3545G	9.50
3545H	9.50
3545J	18.75
3545K	39.75
3545T	10.50

STEEL SECTIONAL PLAN DRAWER UNITS

Tops

	Each
T—36x24	\$ 9.00
T—42x30	11.00
T—48x36	16.00

5 Drawer Units

5—36x24	69.00
5—42x30	79.00
5—48x36	100.00

3 Drawer Units

3—36x24	54.00
3—42x30	59.00
3—48x36	88.00

1 Drawer Units

1—36x24	41.00
1—42x30	43.75
1—48x36	54.00

Plain Bases

PB—36x24	7.50
PB—42x30	9.50
PB—48x36	10.50

Sanitary Bases

SB—36x24	14.25
SB—42x30	15.50
SB—48x36	19.25

Compartments for Drawers

	Per Drawer
Style 1 for Unit—36x24	No Charge
Style 1 for Unit—42x30	No Charge
Style 1 for Unit—48x36	No Charge
Style 2 for Unit—36x24	\$ 1.60
Style 2 for Unit—42x30	1.60

	Per Drawer
Style 2 for Unit—48x36	\$ 1.60
Style 3 for Unit—35x24	3.65
Style 3 for Unit—42x30	3.65
Style 3 for Unit—48x36	3.65
Style 4 for Unit—36x24	5.30
Style 4 for Unit—42x30	5.30
Style 4 for Unit—48x36	5.30
Style 5 for Unit—36x24	6.90
Style 5 for Unit—42x30	6.90
Style 5 for Unit—48x36	6.90

SCHOOL DRAWING TABLES

	Each
3509—Made to order. Price on application	

STUDENT'S WORK BENCH

	Each
3520—Made to order. Price on application	

DRAFTSMEN'S STOOLS

	Each
3579A	\$ 4.40
3579B	8.00
3583A	15.00
3583B	18.60
3580	3.50
3581	10.50
3582	13.75
3586A	10.00
3586B	13.60
3587A	12.50
3587B	16.10
3588	2.25
3589	2.00
3585	
Felt Stool Covers	
	2.00

PASTE, GLUE AND RUBBER CEMENT

	Doz.	Each
3600—3 oz.	\$ 1.80	\$.15
6 oz.	3.15	.30
Pt.	10.80	1.10
3605—3½ oz.	1.80	.15
3612—½ pt.	4.00	.40
Pt.	6.00	.60
3615—4 oz.	2.70	.25
Pt.	7.00	.65
Qt.	13.50	1.25
Gal.		3.50
3616		1.50

HIGGIN'S DRAWING INK

	Doz.	Each
3618	\$ 2.70	\$.25
3618HP		2.40
3618P		3.60
3618Q		6.00
3619	3.00	.25
3625	2.70	.25
3625HP		2.40
3625P		3.60
3625Q		6.00

Empty Bottles and Quills

	Doz.	Each
3629	\$ 1.20	\$.10
3630	1.10	.10
3631 .....	.60	.05

PELICAN DRAWING INK

	Doz.	Each
3632	\$ 3.60	\$.30
3632Q		7.00

PARAMOUNT DRAWING INK

	Doz.	Each
3633	\$ 2.40	\$.25
3633HP		2.00
3633P		3.30
3633Q		5.50

ETERNAL WRITING INK

	Doz.	Each
3634	\$ 1.20	\$.10
3634HP	6.00	.60
3634P	9.00	.90

INK BOTTLE HOLDERS

	Each
3635	\$ 2.25
3636	1.00
3638 .....	.85
3639 .....	.25
3640 .....	.45

GILLOTT'S STEEL PENS

	Gross	Doz.
170—Loose	\$ 2.00	\$.20
290— "	7.50	.75

	Gross	Doz.
291—Loose	\$ 7.50	\$.75
303— "	2.00	.20
404— "	1.50	.15
659— "	7.50	.75
290—Cards	10.00	1.00
291— "	10.00	1.00
659— "	10.00	1.00
850— "	12.00	1.20
1000— "	24.00	2.25

HUNT'S STEEL PENS

	Gross	Doz.	Each
22	\$ 1.50	\$.15	
56	1.50	.15	
68	1.50	.15	
71	1.50	.15	
72	2.00	.20	
99	1.50	.15	
100	5.00	.60	
101	5.00	.60	
102	5.00	.60	
107	5.00	.60	
102C	12.00	1.10	\$.10
107C	12.00	1.10	.10
512	1.75	.15	
513	1.75	.15	
513EF	1.75	.15	
514	1.75	.15	

LEONHARDT'S BALL POINTED PENS

	Gross	Doz.
506F	\$ 2.25	\$.20
506EF	2.25	.20
516F	2.25	.20
516EF	2.25	.20
526	2.25	.20

SPENCERIAN PENS

	Gross	Doz.
1	\$ 1.75	\$.15
9	1.75	.15

CORKO CROW QUILL PENS

	Doz.	Each
3690	\$ 1.40	\$.12

PENHOLDERS

	Doz.	Each
3695	\$ 1.10	\$.10
3696 .....	.50	.05
3697	1.10	.10

LETTERING TABLETS

	Doz.	Each
3700	\$ 1.20	\$.10

ROUND WRITING PENS

	Gross	1/4 Gross	Doz.
3725	\$ 1.60	\$.40	\$.15
3725C	Per Card		.30

Penholders

3730	.....	Each	\$.07
3731	.....		.10

SPEEDBALL PENS

	Gross	Doz.	Each
3732A	\$10.50	\$ 1.00	\$.10
3732B	10.50	1.00	.10
3732C	10.50	1.00	.10
3732D	10.50	1.00	.10
3732SA	.....	.....	.50
3732SB	.....	.....	.50
3732SC	.....	.....	.50
3732SD	.....	.....	.50

Speedball Outfits

3733	.....	Each	\$1.00
3734	.....		2.50

SPEEDBALL LINOLEUM CUTTERS

	Doz.	Each
3735-1	\$ 1.00	\$.10
3735-2	1.00	.10
3735-3	1.00	.10
3735-4	1.00	.10
3735-5	1.00	.10
3735-6	1.00	.10
3735H	1.50	.15
3736	.....	.75

Individual Wrico Guides

	Each
VC500	\$ 3.10
VN500	2.50
VC425	3.00
VN425	2.50
VC350	2.70
VN350	2.20
VC290	2.70
VN290	2.20
VC240	2.50
VN240	2.00
VCN200	3.10
VCN175	3.10
VCN140	3.10
VCN120	3.10
VCN90	3.10
SC500	3.10
SN500	2.50
SC350	2.70
SN350	2.20
SC240	2.50
SN240	2.00
SCN200	3.10
SCN175	3.10
SCN140	3.10
SCN120	3.10
SCN90	3.10
EVCN200	3.40
EVCN175	3.40
EVCN140	3.40

EVCN120	.....	Each	\$ 3.40
EVCN90	.....		3.40
CVC625	.....		3.10
CVN625	.....		2.50
CVC500	.....		2.70
CVN500	.....		2.20
CVC375	.....		2.50
CVN375	.....		2.00
CVC250	.....		2.50
CVL250	.....		2.50
CVN250	.....		1.90
CVC185	.....		2.20
CVL185	.....		2.20
CVN185	.....		1.80
VHC500	.....		2.10
VHN500	.....		1.80
VHC375	.....		1.80
VHN375	.....		1.50
VHCN250	.....		3.10
FC500	.....		2.20
FN500	.....		1.90
FC375	.....		2.00
FN375	.....		1.60
FC250	.....		1.90
FN250	.....		1.50
FC185	.....		1.60
FN185	.....		1.20
Outline Tab Guides	.....		.35
Outline Holder	.....		1.00

MARKING AND SHADING PENS

3737—Size 00-5	.....	Each	\$.25
3738—Size 0-5	.....		.25
3739	.....		1.50

PENHOLDERS

	Gross	Doz.	Each
3746	\$ 9.98	\$.90	\$.10
3747	10.45	.95	.10
3749	6.18	.55	.05
3751	7.22	.65	2/.15
3753	6.84	.60	.05

WRICO LETTERING GUIDES

	Complete Sets	Each
M	\$30.20
A	25.30
B	20.40
E	11.10
KV	8.00
SM	30.20
SA	25.30
SB	20.40
SE	11.10
KS	8.00
F	22.20
D	14.90
EE	12.00
EKV	8.60

WRICO LETTERING PENS

3755-2—3755-7	.....	Each	\$ 1.80
3756A	.....		.60
3756B	.....		.20
3756C	.....		.35
3756D	.....		.40
3756E	.....		.25

Wrico Pen Cleaner

3757—	Doz.	Each
1 oz.	\$ 3.00	\$.35
Pint	.....	1.25

WRICO OUTLINE SETS

	Each
G-100	\$15.60
G-75	15.60

WRICO SHADOW SETS

	Each
VH	\$10.70

WRICO ADSTYLE SETS

	Each
Modern	\$17.50

PENCILS

	Gross	Doz.	Each
3760—Koh-i-noor	\$15.00	\$1.50	\$.15
3766—Metric	7.20	.70	2/.15
3768—Eagle	6.48	.60	.05
3770—Venus	10.80	1.00	.10
3772—Kimberly	10.80	1.00	.10
3776—Castell	15.00	1.50	.15

Castell Refill Pencils

	Gross	Doz.	Each
3777		\$6.60	\$.60

Castell Drawing Leads

	12 Boxes	Box	Each
3779	\$ 6.60	\$.60	\$.15-2/.25

Pencils

	Gross	Doz.	Each
3780—Eldorado	\$10.80	\$1.00	\$.10
3788—Ticonderoga	6.48	.60	.05
3790—Semi-Hex	5.40	.55	.05
3797—			
Metropolitan	3.89	.40	.05
73B—			
Medium Mephisto	12.25	1.10	.10
73B—			
Hard Mephisto	12.25	1.10	.10
73B—			
Extra Hard			
Mephisto	12.75	1.15	.10
77—			
Medium Mephisto	12.75	1.15	.10
77—Hard Mephisto	12.75	1.15	.10

MECHANICAL PENCILS

	Each
3801—Norma	\$ 3.50
3801G—Norma	5.00
465—Listo	.75
41—Listo	.35
5—Listo	.35
10—Listo	.35
1620—Listo	.25
1623—Listo	.25

LEADS FOR MECHANICAL PENCILS

	Per Tube
1246—Black Leads	\$.10
1246—Colored Leads	.15
1076—Black Leads	.15
1076—Colored Leads	.15
162—Colored Leads	.15
3162—Colored Leads	.15

PENCIL LENGTHENERS

	Gross	Doz.	Each
3810		\$ 1.75	\$.15
3815	\$12.60	1.20	2/.25
3817	9.00	.85	.10
3820	4.95	.50	.05

RUBBER PENCIL TIPS

	Gross	Doz.
3828	\$ 1.80	\$.20

PENCIL CLIPS—PENCIL POCKETS

	Gross	Doz.	Each
3830	\$ 5.00	\$.50	\$.05
3833		2.00	.20

TUTOR JEWEL SHARPENER

	Each
3840	\$.60
3840C	Per Set .20

TACK LIFTER—PENCIL POINTERS

	Doz.	Each
3843		\$.65
3845	1.60	.15
3846	2.10	.20

PENCIL SHARPENERS

	Each
3847—Giant	\$ 1.90
3848—Chicago	1.25
3849—Dexter	5.95
3849DC—Dexter	6.20
Extra Cutters	Pair
3847C	1.10
3848C	.90
3849C	1.65
3849DCC	1.90
3847F	.30

COLORED PENCILS

	Gross	Doz.	Each
3850—Poly-chrome	\$15.00	\$1.50	\$.15
3850-12			1.75
3850-24			3.40
3850-36			4.75
3850-60			8.25
3852—Dixon's			
Best	12.15	1.15	.10
3852-12			1.15
3852-24			2.30
3858—China			
Marker	19.44	1.80	.15
3859G—Gold	10.80	1.00	.10
3859S—Silver	10.80	1.00	.10
3860—Thinex	10.80	1.00	.10
3860-12			1.00
3860-24			2.00
3865—Mongol			
Indelible	10.80	1.00	.10
3865-12			1.00
3865-24			2.00
3866—Kimberly	10.80	1.00	.10
3866-12			1.00

LUMBER CRAYONS

	Gross	Doz.	Each
3870—Faber's	\$ 9.60	\$1.00	\$.10
3871—Dixon's	9.60	1.00	.10
3872—Dixon's	8.00	.75	.10
3872S—Dixon's	8.00	.75	.10

Lumber Crayon Holder

	Each
3873	\$.35

METAL WORKER'S CRAYON

	Doz.	Each
3875	\$.50	\$.05

ERASERS

	Gross	Doz.	Each
3881—Claro	\$12.96	\$1.20	\$.10
3883A—Art Gum..	5.22	.50	.05
3883B—Art Gum..	7.20	.70	2/.15
3883C—Art Gum..	10.44	1.00	.10
3883D—Art Gum..	21.60	2.00	.20
3883E—Art Gum..	54.00	5.00	.50
3884A—Plastic	6.48	.60	.05
3884B—Plastic	11.52	1.10	.10
	Box	Doz.	Each
3885-60	1.71	.36	.05
3885-40	1.71	.54	.05
3885-30	1.71	.72	2/.15
3885-20	1.71	1.08	.10
3885-8	1.71	.....	.25
3885-4	1.71	.....	.50
	Gross	Doz.	Each
3886—Artex	6.48	.60	.05
3887—Coraline	6.48	.60	.05
3888A—			
Pink Pearl	6.48	.60	.05
3888B—			
Pink Pearl	11.52	1.10	.10
3889—			
Hexo-Cleaner	11.52	1.10	.10
3894A—Ruby	6.48	.60	.05
3894B—Ruby	11.52	1.10	.10
3895—Tri-Ply	6.48	.60	.05
3897—Elliptic	6.48	.60	.05
3898—Duplex	6.48	.60	.05
3899—Coral	11.52	1.10	.10
3900A—Wonder ..	6.48	.60	.05
3902—Tri-Flex	6.48	.60	.05

MOTOR DRIVEN ERASERS

	Each
3905	\$15.00
3907	6.50

Erasers for Motor Driven Erasers

	Gross
3906-7	\$ 1.00
3906-8	1.00
3906-12	1.00
3906-14	1.00
3906—Assorted	1.00

STEEL ERASERS

	Each
3909	\$.55
3910 .....	.60

CHART WEIGHTS

	Each
3913	\$.85
3914	1.20
3915	1.00

ERASING SHIELDS

	Doz.	Each
3922	\$ 2.50	\$.25
3924	3.00	.30

RUBBER BANDS

	1/4 Lb.	1 Lb.
3936	\$.35	\$ 1.25
3937 .....	.35	1.25

MAP TACKS

	Disc of 20
3939	\$.20

THUMB TACKS

	German Silver	Doz.
3940		\$.85
3941		1.00
3942		1.20

Brass

	Gross
3960	\$.50
3961 .....	.60
3962 .....	.75

Twistout

	Gross	Doz.
3966	\$ 2.40	\$.20

One-Piece Steel

	Per 1000	Per 100
3970	2.00	.25
3971	2.40	.30
3972	2.80	.35
3973	3.20	.40

	Gross	Doz.	Box
3974A	\$ 5.50	\$.50	\$.05
3974B	5.50	.50	.05

Solid Head Steel

	Per 1000	Per 100
3976	2.40	.30
3977	2.80	.35
3978	3.20	.40
3979	4.00	.50

Tack Lifters

	Each
3980	\$.05
3981 .....	.30

PAPER FASTENERS

	Per 1000	Per 100
4008-1	\$ 1.67	\$.20
4008-2	1.98	.25
4008-3	2.60	.30
4008-4	3.23	.35
4008-5	9.13	.95
4008-6	10.38	1.05
4009	1.67	.20
4012	.58	.10
4012C	.63	.10
4013	.58	.10
4013C	.63	.10

Paper Clips

	Doz.	Each
4014A	\$.50	\$.05
4014B	1.00	.10
4014C	2.00	.20

PAPER PUNCH

	Each
4017	\$ 3.00
4017A—Short	.30
4017A—Medium	.40
4017A—Long	.50

STAPLERS AND STAPLES

	Each
4022	\$ 1.75
	Per 1M Per 10M
4023	\$.35 \$ 2.90

OIL STONES

	Each
4042	\$.85
4044	1.25
4046	3.40

CHARCOAL

	Per Box
4050	\$ 1.00
4051	2.00

CRAYON HOLDERS, STOMPS, CHAMOIS

	Doz.	Each
4063	\$ 1.50	\$.15
4066-2	.70	.07
4066-4	1.00	.10
4066-6	1.20	.12
4066-8	1.50	.15
4068	.30	—
4072	2.20	.20

FIXITIF AND ATOMIZER

	Doz.	Each
4075	\$ 3.00	\$.25
4078—2 oz.	1.80	.15
4 oz.	3.00	.25
Pint	—	.70
Quart	—	1.25

WATER COLORS

	Each
4101	\$.35
4101 ½	.25
4102	.70
4102 ½	.40
4103	.85
4103 ½	.50
4104	1.25
4104 ½	.70
4110	.35
4111	.50
4113	.50

Empty Japanned Boxes

	Each
4140A	\$ 1.90
4140B	2.40
4140C	3.00

SHOW CARD COLORS

	Doz.	Each
4150— 2 oz.	\$ 3.00	\$.25
8 oz.	7.80	.65
16 oz.	13.20	1.00
4151— 1 oz.	3.00	.25
2 oz.	4.80	.40

WATER COLOR BOXES

	Each
4165	\$.50
4168	2.25

Color Refills

	Each
04168	\$.15

ARTISTS' CHINAWARE

	Each
4177	\$.80
4194	.50
4195	.90
	Per Set
4200	1.50
4202	2.00

Water Glasses

	Each
4206	.25
4209	.10

WATER COLOR BRUSHES

	Each
4212-1 Red Sable	\$.30
2	.35
4	.45
6	.65
7	.90
8	1.20
10	1.75
12	2.50

Camel Hair							
		Doz.	Each			Doz.	Each
4215-1	.....	\$ 1.50	\$.15	4216-1	.....	\$ .50	\$.05
2	.....	1.60	.15	2	.....	.60	.06
4	.....	1.90	.20	3	.....	.70	.07
6	.....	2.25	.20	4	.....	.80	.08
7	.....	2.70	.25	5	.....	.90	.09
8	.....	3.00	.30	6	.....	1.00	.10
10	.....	4.20	.40	7	.....	1.35	.15
12	.....	5.40	.50				

SABLE SHOW CARD BRUSHES		
	Each	
4213-1	\$.25	
2	.25	
4	.30	
6	.35	
8	.40	
10	.65	
12	.85	

OX HAIR BRUSHES		
	Each	
4214-1/8"	\$.30	
1/4"	.40	
3/8"	.45	
1/2"	.55	
5/8"	.70	
3/4"	.85	
7/8"	.95	
1"	1.25	

MAPS		
	Each	
5000	\$.15	
5010	.60	
5012	.15	
5014	each sheet .30	
5015	.25	
5017	.25	
5018	.60	
5020	.40	
5021	.60	
5023	.50	

	Each	
5024	\$.60	
5026	each sheet .30	
5028	.50	
5030	.30	
5040	.60	
5052	.75	
5054	1.25	
5056	.20	
5058	.20	
5060	.10	
5062	.02	
5070	.75	
5075	.50	

SCIENTIFIC BOOKS		
	Each	
6000	(2 volumes) \$10.00	
6002	8.00	
6004	1.25	
6006	10.00	
6010	6.00	
6012A	3.50	
6012B	6.00	
6012C	6.00	
6014	4.00	
6016A	8.00	
6016B	7.50	
6020	6.00	
6026	1.50	
6028	.60	
6030	5.00	
6032	6.00	
6042	2.50	
6044	4.00	
6048	3.00	

	Each	
6050	\$ 1.50	
6052	8.00	
6054	10.00	
6056	4.00	
6058A	2.50	
6058B	2.50	
6060	7.00	
6062	2.00	
6082	2.00	
6086	4.00	
6094	2.00	
6114A	.35	
6114B	.35	
6120	.50	
6129	5.00	
6130	5.00	
6132	3.00	
6136	17.50	
6138	17.50	
6140	8.00	
6148	1.00	
6150	4.50	
6152	4.00	
6153	7.00	
6154	2.00	
6160	Price on application	
6160A	Price on application	
6162	7.00	
6164	6.00	
6174	6.00	
6202	6.00	
6204	7.00	
6220A	4.00	
6220B	3.50	
6222	4.50	
6226	3.50	



CAT 50

INSERT
BACK COVER OF PRICE LIST
INTO THIS POCKET

THIS CATALOG IS

Nº 2113

